MAY 16, 1955

STEEL

The Metalworking Weekly

Business Communication:

Put it on executive-saving time

—page 103

No. 4 in 1955 Management Series

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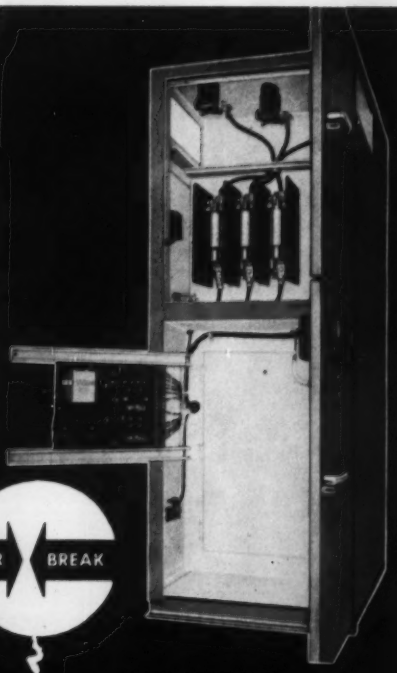
AN EASY WAY TO SELECT HIGH INTERRUPTING CAPACITY STARTERS

50,000 KVA*	POWER FUSES		VALIMITOR	
2200-5000 volts	2300 Volts	4800 Volts	2300 Volts	4800 Volts
	150,000 kva	250,000 kva	unlimited kva bus	

* Certified



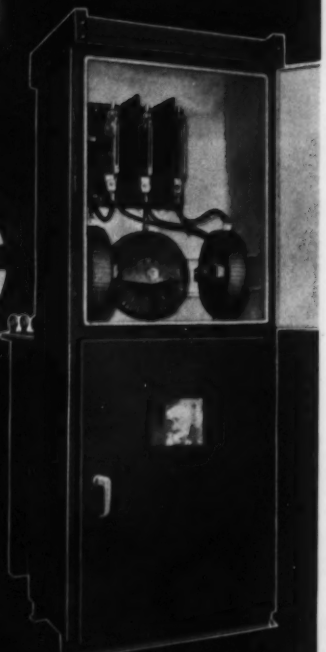
On Air-Break ZHA Starter, overload relay panel swings out. Opening of inner door gives access to motor terminals and rear of contactor.

AIR BREAK

YOUR BEST BUY FOR SHORT CIRCUIT PROTECTION

EC&M (2200-5000 VOLT) MOTOR STARTERS

OIL IMMERSED



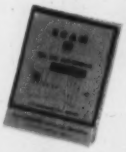
EC&M Oil Break Starter of VALIMITOR type has ZHS, 50,000 KVA Contactor mounted under oil in rear tank.

No matter how you figure it . . . high voltage motor starters, with adequate interrupting capacity, are your best investment.

Should a fault occur, vital drives are protected by clearing the circuit quickly. The need for extensive repairs or replacements has been minimized. Down-time is reduced. This results in lower costs.

Although short circuit values get greater as KVA capacities grow, EC&M's complete line of Motor Starters provides a wide range of selection to cover any requirement. They are available in Oil and Air-Break styles having interrupting capacity ratings shown above . . . note there are 3 ratings in both oil and air break.

The ceiling on the short circuit problem has been lifted. Be sure you have the information on this wide choice of EC&M Motor Starters for 2200-5000 volt motors.



Write for handy new catalog 6062 showing complete coverage of 2200-5000 volt motors.

THE ELECTRIC CONTROLLER & MFG. CO.

4498 LEE ROAD • CLEVELAND 28, OHIO

6072

Attractive screw-driver kits include an unbreakable plastic handle and a selection of blades for the handyman's pocket.

The flexible wire shaft of this handy model makes it easy to get at screws when there's no elbow room to spare.

making millions of screw drivers for the nation's handymen

A visit to the busy plant of Oxwall Tool Co., Ltd., at Oxford, N. J., is one to make the handyman's eyes gleam. Here he sees more sizes and varieties of screw drivers than he ever dreamed of. Small ones, big ones, and a variety of special types. Many are packed in attractive kits and sold all over the world.

Oxwall is a large user of Bethlehem special-purpose screw-driver wire in round and square sections, and supplied in both carbon and alloy grades.

Bethlehem makes just about every kind of steel wire. And we control the entire steelmaking process from mining the ore right down to the final drawing of the wire. Some are general-purpose grades; others, like screw-driver wire, are tailor-made for a specific application.

We'll be glad to work with you all the way in helping you to get the most from your steel wire. Just write us at Bethlehem, Pa., or at our nearest sales office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM WIRE

thousands and thousands and thousands and thousands

OF SKF SY UNIT PILLOW BLOCKS GOING INTO SERVICE

SY Unit Pillow Block

FY Flanged Housing

Aligning Bearing Unit

Because they have the most effective bearing seal ever perfected—the famous SKF Red Seal, made of DuPont "Fairprene"... Because external rotating flingers exclude dirt... Because they are easy to install on standard shafting... Because they are interchangeable with existing installations... Because they are available promptly from distributors' stocks for shaft diameters ¾" to 2 15/16".

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.— *manufacturers of* SKF *and* HESS-BRIGHT® *bearings.*

7618

Order from *authorized* SKF distributors anywhere. The red and white SKF box encloses the finest bearings made.

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SKF

BEARINGS AND PILLOW BLOCKS

Now See the Entire Collection of "Award-Winning" Kling Metal Fabricating Machines in this New Bulletin 100

In the new Kling Bulletin you will find illustrations and data representing over 50 Kling Machines. These versatile machines, performing scores of metal-working operations, are winning "Production Oscars" for thousands of companies throughout the world. It is the increased production . . . labor-saving . . . cost-cutting results from Kling machines that account for their increasing use in "the best of companies." Such results as shown here* can be yours. We will be glad to send you a list of users in your industry, along with your free copy of the new Complete Line Bulletin 100. Why not send for it today?

A **KLING DOUBLE ANGLE SHEARS** *One Chicago manufacturer reports that this machine is cutting his labor costs 75%

B **COMBINATION SHEAR, PUNCH & COPERS** *A large railroad shop reports that this "jack-of-all-jobs" gets 16 hours' work from an 8-hour shift

C **HIGH SPEED FRICTION SAWS** *A famous midwest manufacturer reports that one of these saws cuts 1000 to 1300 channels, angles, round and flat bars, every 8-hour day

Since 1892

Kling BROS. ENGINEERING WORKS

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Makers of Friction Saws; Shears—Rotary, Double Angle and Guillotine; Punches; Combination Shear, Punch and Coper; Angle and Plate Bending Rolls; Bulldozers.

Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd Street, New York 17, N. Y.

Gold mine refuse + World's greatest tank lining job = Uranium

URANIUM now is being recovered from the yellow mountains of slimes residue surrounding the gold mines on the Rand in South Africa. The process involves treatment of the abrasive, spent ore with sulfuric acid. No small problem was the protection of the many tanks, pumps and miles of piping from the twin attack of acid and abrasion. The answer was the world's largest sheet-rubber tank lining job.

A vital role in solving the many problems created by the sheer size and remoteness of the installations, plus subtropical heat and rains, was played by the G.T.M.—Goodyear Technical Man. Most important was his specification of PLIOWELD — especially compounded, acid- and abrasion-resistant rubber—and a *chemically curing* field procedure that eliminated sectionalized tanks or filling the tanks with hot water to vulcanize the rubber to the metal.

Over *six and one-half acres* of PLIOWELD have been used to protect equipment in this operation to date. Ultimately, some 1,250,000 square feet of tank surfaces, 50,000 feet of pipe and 1,000 pumps will be armored with rubber. How can PLIOWELD help you in your fight against corrosion? For details, see the G.T.M. or write: Goodyear, Industrial Products Division, Akron 16, Ohio.

Plioweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

PLIOWELD Tank Linings by

GOODYEAR

THE GREATEST NAME IN RUBBER

STEEL
The Metalworking Weekly

MAY 16, 1955
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FOR USERS OF 10-LB. PIGS

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- MORE EVEN MELTING
- MORE ACCURATE CONTROL
- EASIER CHARGING BY COUNT
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- EASIER HANDLING

Available in all grades and extra-close-grain HannaTite. (Standard 38-lb. pigs also available.)

THE HANNA FURNACE CORPORATION

Buffalo • Detroit • New York • Philadelphia

Merchant Pig Iron Division of

NATIONAL STEEL CORPORATION

behind the scenes

The Acid Test

What would you say about a man who aims to rear back and throw bricks at 3074 metalworking plants where pickling operations are performed?

That's just what Joseph A. Snook, executive vice president, Atlas Mineral Products Co., Mertztown, Pa., plans to do.

Mr. Snook's company makes corrosion-proof cement. He wants to dunk samples of it in pickling tanks all over the country. His first mailing of a few carloads of sample briquets is ready, and we expect direct mail advertising boys are watching this operation with more than usual interest. It's the first time post offices will have been flooded with bricks, and it's the first bulk mailing we ever heard of being steered directly into acid tanks.

Glad All Over Department

Pride has several meanings: For one thing, it means a reasonable delight in achievements. Just for kicks, it also means a pack of lions. Since we are usually uneasy in the presence of cats, let's skip them and return to the delights of achievement.

In the 17th annual editorial competition conducted by *Industrial Marketing*, 470 entrants eyed the 18 certificates and 5 plaques that were dangled as prizes. Anybody with half an eye, as the saying goes, could see that there were scarcely enough prizes to go around, and that at least 447 publishers were going to continue publishing with tears in their eyes.

As it happened, three Penton publications, STEEL, *Machine Design* and *Foundry*, knocked off five awards among them. The "reasonable delight in achievement" reflected hereabout is a poor definition of the actual pride felt by the Penton people. The *Machine Design* and *Foundry* crowd is jumping, man; and the STEEL gang is rocking, Jack, rocking. STEEL received a real gone bronze plaque for its Program for Management—1954, and an award of merit for its covers.

Since the inception of *Industrial Marketing's* annual editorial competition among business papers 17 years ago, no other metalworking publication has won so many awards as STEEL. It sort of makes us nervous to work for a magazine *that* good; makes our shortcomings that much more noticeable.

Whatsa' Cook, Mac?

Out in Stanford, Calif., Science Service boys are writing up their findings in something that looks like gleanings from the United Nations' wastebaskets. They call this novel gobbledygook Interlingua, and its inventors claim that if you have a smattering of English, French, German, Italian, Spanish and Portugese you can understand the stuff at sight. A knowledge of Gaelic or Algonquin won't help you at all, as far as Interlingua is concerned, but that is not too important: Persons who know those languages best seldom can converse even with one another, anyway.

Here's a paragraph in Interlingua taken from a news bulletin from Stanford Research Institute: "Le lumine solar que nos vide—e le portiones ultraviolette e infrarubie que nos non pote vider—es un radiation electromagnetic, exactemente como le undas de radio e television."

No wonder that only canis nutza and Anglais homos go out in the noonday solar!

The Matched Equation

The puzzle fans had no trouble with Hasraphij's horses; so many letters arrived at once we can't list them all. All writers agreed that one red stallion was worth five old gray mares; one brown mare, two old gray mares; one black colt, four old gray mares.

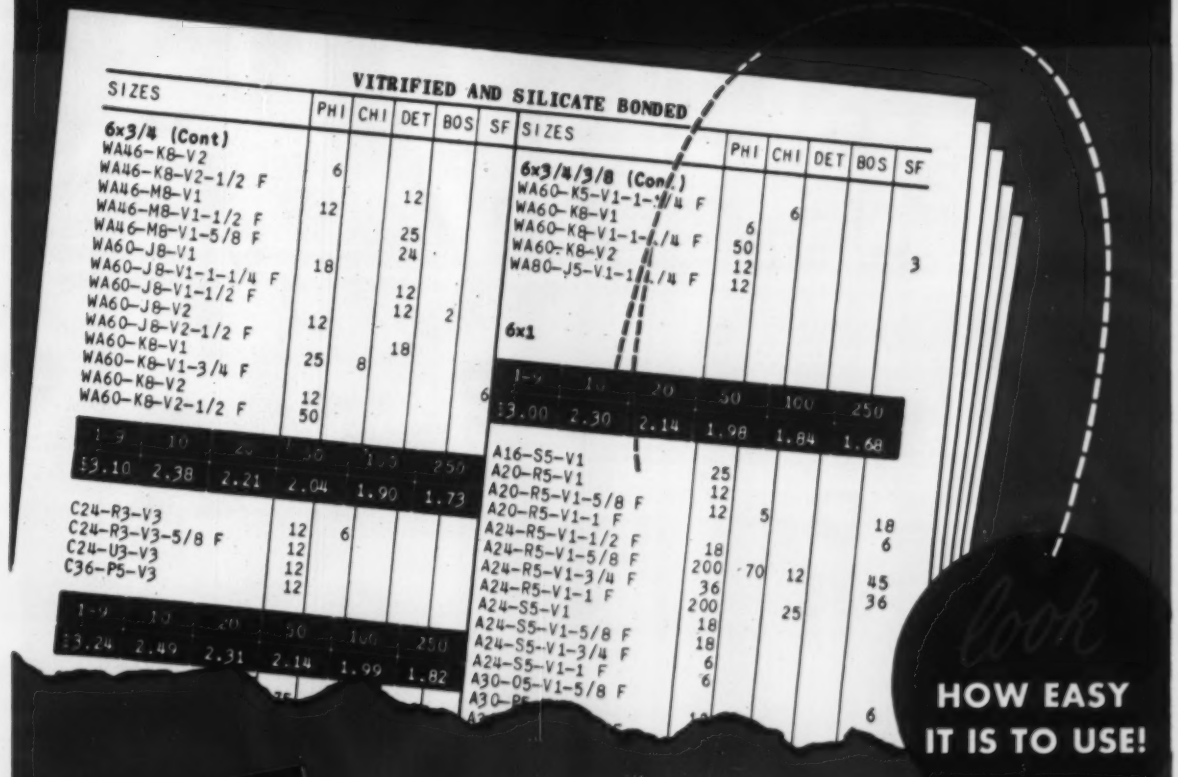
Next time you're out with friends, astound them with this one: Arrange nine matches in this manner, then slyly invite anyone to correct the equation through the strategem of moving only one match:

1 — 111 = 11

Shrdlu

(Metalworking Outlook—Page 57)

Now.. for your convenience consumer *net prices* for SIMONDS grinding wheels



look

HOW EASY IT IS TO USE!

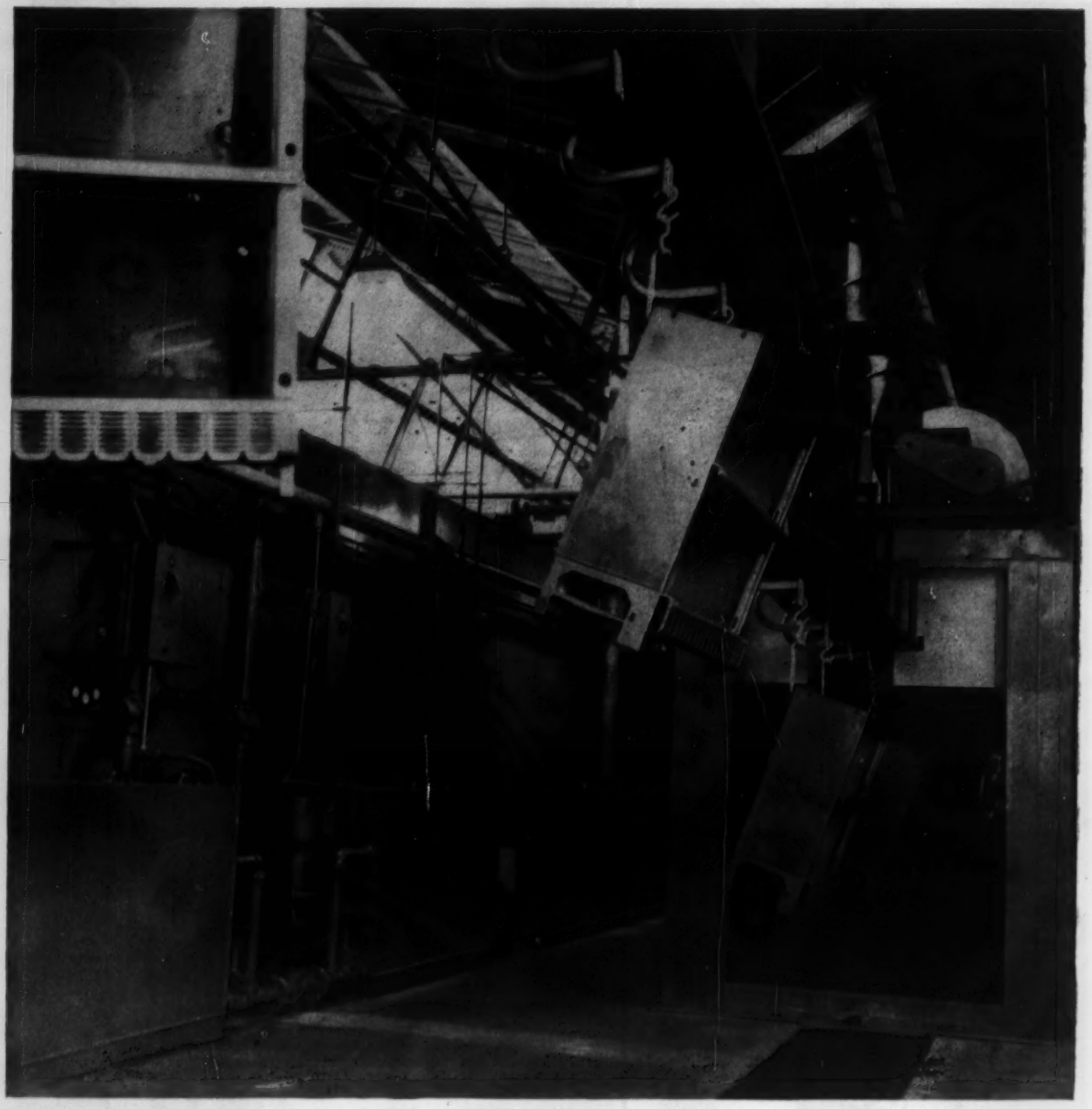
Grinding wheel users will find this book a boon to the problems of grinding wheel pricing and delivery. Here, shown together for the first time, is complete availability of all the stock items of Simonds Grinding Wheels and *Consumer Net Price* per wheel in every ordering quantity.

SEND FOR YOUR COPY

SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA.

EXTRA SAVINGS SIMONDS STOCK · SERVICE KNOW-HOW

(Advertisement)



AMERICAN INDUSTRY IMPROVES PRODUCTION...THANKS TO *GAS*

This is a gas-fired drying oven at the John J. Nesbitt Company in Philadelphia. The Company manufactures heating, ventilating and air-conditioning products, ranging from baseboard radiation to large volume blower fan units. This oven is one of the largest of its type in the country. It can take pieces up to 10 feet long on an overhead conveyor. Each can be painted a different color without interrupting the flow of the production line.

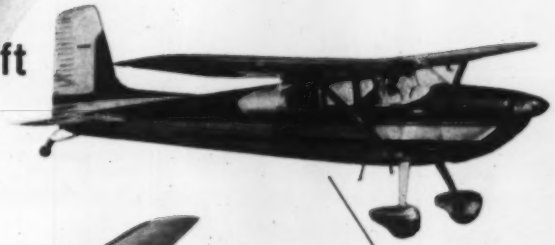
Throughout the entire process at Nesbitt's, Gas is installed as part of the line. The flexibility of Gas allows close temperature control in a series of chemical baths and rinses preceding the drying and paint-baking process, and without expensive heat-up periods. The dry-off oven is ready in just 10 minutes, and the paint bake oven is ready in less than 25. Gas is used because it is faster, cleaner, and keeps operating costs down.

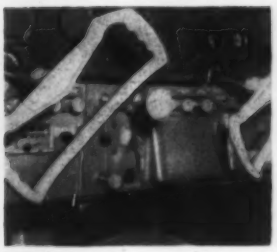
The John J. Nesbitt Company finds Gas the most satisfactory method of heat processing for its operation. That's reason enough for you to discuss your problem with your Gas Company's industrial specialist.

American Gas Association.

U. S. Royalite wins its wings

in the aircraft industry





Tough, versatile Royalite has found increasing and diversified uses in the aircraft industry.

Cessna Aircraft Company, Wichita, Kansas, builders of fine personal and executive airplanes, was among the first to recognize Royalite's advantages.

Royalite was first used in the Cessna 170 several years ago. Later, more uses were found in the Cessna 180. The luxurious new Cessna 310 has even more Royalite parts, many in the handsome interior. There have been increasing uses with each new model. Yes, the aircraft industry, like so many other industries, is finding more and more uses for Royalite. Here are 6 of the important reasons:

- Tough, high impact strength, and long wear.
- Beauty and durability of color and grain finish.
- Lighter weight than commonly used metals.
- Low tooling costs and inexpensive forming operations.
- Resistant to most oils, acids and chemicals.
- Engineering and design versatility for contours and sharp detail.

Manufacturers in almost every field have used Royalite in solving production and cost problems. There's a Royalite use for *your* product. Get all of the facts. See how Royalite can improve appearance and performance—*and cut costs.*

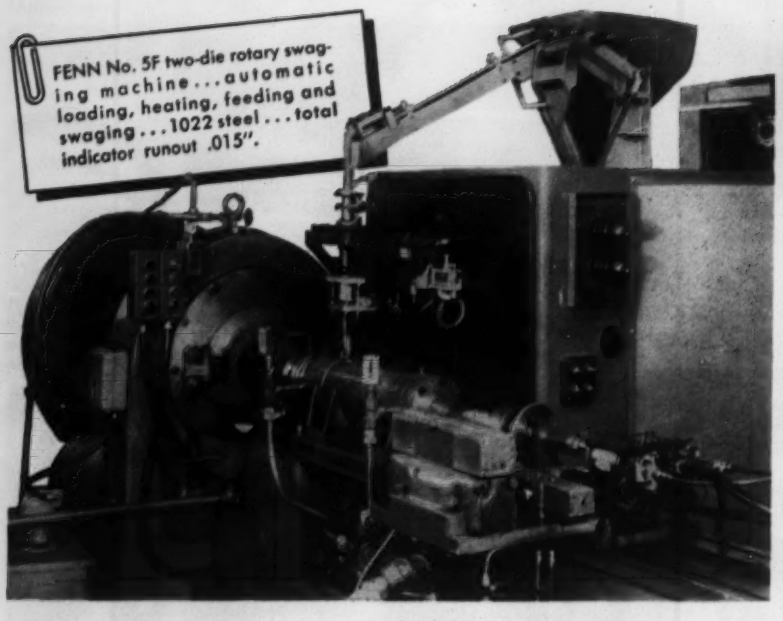
U.S. ROYALITE®
TOUGH, VERSATILE FABRICATING MATERIAL

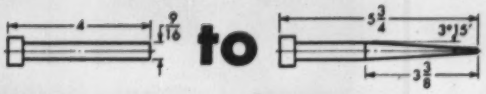
US RUBBER

Write, wire, phone:

UNITED STATES RUBBER COMPANY

2638 NORTH PULASKI ROAD, CHICAGO 39, ILLINOIS


FENN No. 5F two-die rotary swaging machine... automatic loading, heating, feeding and swaging... 1022 steel... total indicator runout .015".

Change  to at 500 per hour with full automation

FENN offers to the metal industry . . .

- a completely new and automatic swaging package
- with full automation in loading and feeding
- plus the material and labor savings inherent in swaging.

Now, more industries can profit from hot or cold swaging. Present users of swaging machines can greatly increase their productivity. Or we can design a complete assembly to suit your requirements.

Precision Rolling Mills — Turks Heads — Wire Shaping Mills — Swaging Machines — Accessories.

FENN

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Please send me more information about your Rolling Mills ☐, Swaging Machines ☐, Turks Heads and Wire Shaping Mills ☐.

*Name*_____ *Title*_____

*Company*_____

*City*_____ *Zone*_____ *State*_____

LETTERS TO THE EDITORS

Stamp of Approval

I feel your article, "Stamping Sales: Up 10% in '55" (Apr. 4, page 36), points out both diversification and competition. These are healthy symptoms of an economy working its way toward more efficiency, keener market evaluation and steady product improvement.

Your article appears to be more evidence that the American economy is holding its own and advancing into a firmer state of better security. Perhaps the rise in stamping sales is based on the rise in production of the automotive industry. But the emphasis on diversity keeps the end result from being dependent on this single factor.

Cliff Miller
director of public relations
Designers for Industry Inc.
Cleveland

• *Thank you.—ED.*

Make or Buy?

We have urgent need for tear sheets or information on . . . when it is more economical to purchase parts or components than to manufacture them. We would appreciate a prompt reply.

Ted Grange
public relations director
Stewart-Warner Corp.
Chicago

• *Being forwarded is a tear sheet of the article, "Job Shops: Six Paths to Profit" (May 2, page 73). Part of this article deals with whether it is more economical to buy or to make. Also being sent is a pamphlet by Clement C. Caditz, president of Northern Metal Products Co., on* Stampings—Make Them? Or Buy Them?*—ED.*

Nailmakers Sought

How may I secure a list of nail manufacturers in the United States and abroad? Any suggestions will be appreciated.

E. D. Sperry Jr.
P. O. Box 936
Santa Barbara, Calif.

• *We are forwarding a list of 35 domestic producers of nails, taken from the 1954 edition of* Guide for Steel Buyers. *Sorry, we don't know how to track down a listing of those abroad.—ED.*

Useful Inventions

One of our associate companies in South America wants a Patent Board listing entitled *Food Products and Processes*, which contains abstracts on government-owned patents. It was mentioned in the "Windows of Washington"

(Please turn to page 12)

576 million gallons of water in 9600 hours

. . . that's average for a Chrysler Industrial V-8-powered irrigation pump in West Texas

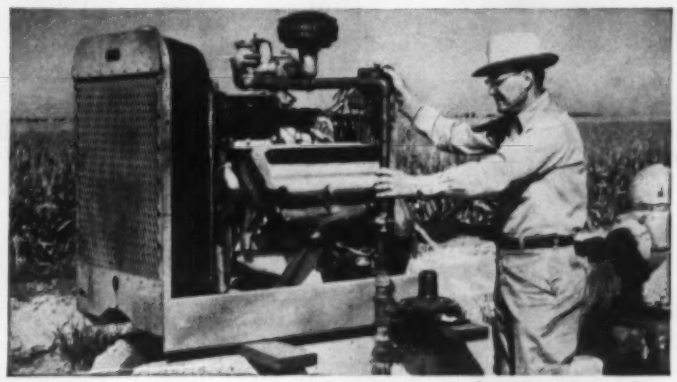


Photo courtesy Louthan-Dowell Motors, Lubbock, Texas

Lloyd Huffaker, Lubbock, Texas, stands beside his Chrysler Ind. 24A-powered irrigation pump. In 2½ years, Mr. Huffaker has irrigated three crops of cotton, maize and alfalfa, his pump and Chrysler Industrial Engine operating approximately 133 twenty-four hour days during each season. Pump has delivered an average of 1000 gallons per minute, for a grand total of 576,000,000 gallons of water. Total maintenance repair in 2½ years: One set of spark plugs and three sets of points installed at total cost of $10.00. If the total revolutions this engine has turned were reduced to miles, they would equal approximately 336,000 miles—or more than thirteen times around the world.

Ask any grower in West Texas what the local performance record for an irrigation pump is and, chances are, he won't know . . . records are broken every day in Texas. He just assumes his pump will bring water up approximately 320 feet in sufficient quantity to irrigate his entire crop every day of his 120 to 200 day growing season.

But ask any West Texas grower *what engines* power his irrigation pumps, and if he's like better than 85% of West Texas growers, he'll tell you — Chrysler Industrial. And if you ask him why, you will get an answer based upon better than fifteen years experience — his own and his neighbors'.

For instance, a West Texas grower might tell you that, among lightweight high-speed engines operating on either butane or natural gas, Chrysler is the only engine equipped with all the truly *industrial* engine features. As examples he could mention features like sodium-cooled exhaust valves with extra-hard stellite valve heads and valve seats, heavy duty induction hardened crankshafts and large tri-metal bearings. Finally he would probably point out that a single Chrysler Industrial Engine has been driving his centrifugal pump nearly ten years without a major overhaul while during the same period competitive power plants may likely have required two or three overhauls.

If it's real industrial power *you* need . . . for irrigation or any other equipment, you can't buy an industrial engine to equal Chrysler, 230 to 413 cubic inches displacement. For details, see a Chrysler Industrial Engine Dealer, or write: ***Dept. 85 Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

Chrysler Industrial 24A
331 cubic inch
Displacement Engine

CHRYSLER
Industrial Engines

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

HORSEPOWER WITH A PEDIGREE

NORTH CAROLINA

industrial sites like this—

provide attractive opportunities for

MANUFACTURERS of HARDWARE and other FABRICATED METAL PRODUCTS

Desirable sites, with plenty of space for efficient one-floor plants and extra room for growth, are available now in North Carolina, the South's leading industrial State.

Mountain, piedmont and coastal areas have abundant native-born, cooperative labor with a fine record of productivity.

Furniture hardware and a wide range of metal products have many potential purchasers here and in surrounding states, plus major markets within overnight reach. Raw materials are accessible from northern and southern suppliers.

Transportation, power, natural gas . . . year-round moderate climate . . . a favorable tax "package" that adjusts to the rise and fall of business conditions . . . friendly State and local governments—these are some of the factors which contribute to the success of metal-working plants in North Carolina.

A special brochure is available upon request to Ben E. Douglas, Director, Dept. of Conservation & Development, Raleigh 10, N. C.

Friendly North Carolina Where Industry Prospers

LETTERS

(Concluded from page 10)

department (page 48) in your Nov. 22, 1954, issue. Can you advise us where it can be obtained?

E. Davis
Bunge Corp.
New York

• *It may be purchased from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.—ED.*

Men Want Muscles

The article, "More Muscles in Steel" (Apr. 25, page 96), was of great interest to our estimating department. The 15 men in it would like copies.

Roy Hermanson
chief estimator, Dept. 174
Axelson Mfg. Co.
Los Angeles

We have found this article to be interesting and informative. Please send a copy for reference.

George R. Beck
production engineer
Development Laboratories
Pacific Division
Bendix Aviation Corp.
Burbank, Calif.

• *Sent.—ED.*

Hot Stove Query

Can you give me information about the stove pictured in the article, "Metals' Growing Stake in Housing" (Apr. 11, page 65)? Is this stove available and from whom?

Mrs. O. F. Lenk
25 Aberdeen Drive
Middletown, O.

• *You can't hardly get them no more . . . that is, if you mean the* old, *not the* modern *stove. The Amity stove was made by the Gill Stove Co., Rochester, N. Y. We don't believe the company is still in business, having checked our records as far back as 1926. For further information on either stove, we suggest you write the Crane Co., 836 S. Michigan Ave., Chicago 5, Ill. It supplied the photographs.—ED.*

Job Shop Analysis

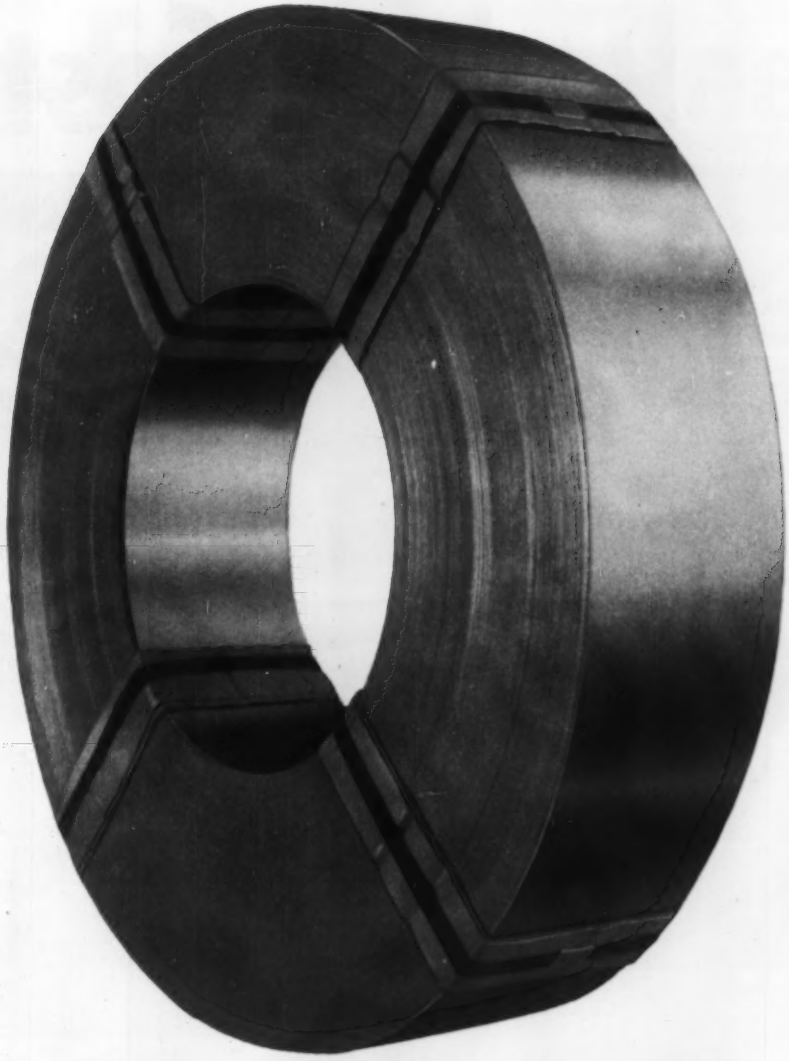
I have read your article, "Job Shops: Six Paths to Profit" (May 2, page 73), with interest. The analysis of the job shop business in this article is one of the best I have seen in recent years. May I have three copies?

Fred Schlosser Jr.
Schlosser Mfg. Co.
Philadelphia

Please send three copies. I want them for a meeting of the National Tool and Die Manufacturers Association in Washington.

Willis G. Ehrhardt
Erhardt Tool & Machine Co.
St. Louis

• *Sent.—ED.*



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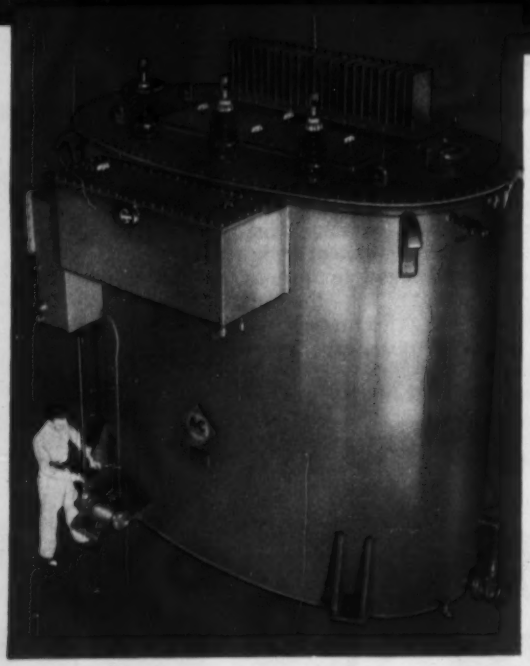


TRANSFORMERS

Well-balanced design and extra-heavy duty construction are used in the Allis-Chalmers arc-furnace transformer. Past records show ability to withstand as much as 25 to 30 years of the repeated daily short circuits encountered in furnace operation. Extremely heavy supports and structure are used to brace coils against the severe short-circuit stresses.

Skillful insulation techniques protect windings from overvoltage due to wide tap range. Some units are designed for as much as 50% range in secondary voltages. Tap-changing mechanism, specially designed for arc-furnace transformers, is in separate compartment to facilitate maintenance. Wide flat contacts provide the long life needed for numerous daily tap-changing operations.

ALLIS-

Arc-Furnace Steel

Use Allis-Chalmers Integrated Electrical Equipment—and you...

SAVE **on Engineering** — Allis-Chalmers steel mill specialists coordinate equipment, submit single complete package proposal.

SAVE **on Purchasing** — One order, one invoice, one follow-up for the complete furnace electrical system.

SAVE **on Installation** — All components are matched for easy installation. Delivery is coordinated to prevent delays.

SAVE **in Operation** — All equipment is designed and built to work together. One reliable supplier guarantees performance of complete electrical system.

TAKE ADVANTAGE of Allis-Chalmers complete line of arc-furnace equipment—transformers, *Regulex* control, switchgear, associated controls—backed by 45 years of experience. Call your nearby Allis-Chalmers District Office for assistance when you are planning new facilities or modernization. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

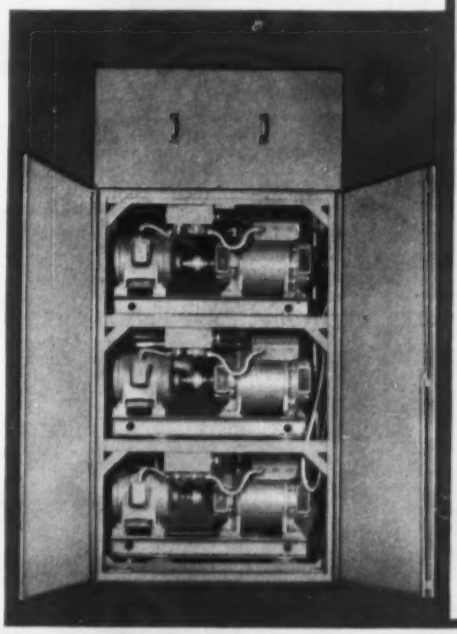
Regulex and *Ruptair* are Allis-Chalmers trademarks. A-4742

REGULEX CONTROL

Balances arc current with arc voltage almost instantly—maintains desired arc conditions by automatically varying distance between electrode and charge.

With *Regulex* rotating amplifier there are no contacts or switching devices between the regulator and electrode motor. Continuously closed circuit provides constant positive control, minimizing current surges, cutting power consumption.

Simple design of *Regulex* results in lower maintenance. Provisions for spare unit mounted on top assure continuous operation under all conditions. Tier construction — open or enclosed —conserves valuable floor space.



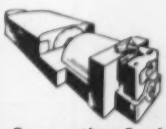
Other Allis-Chalmers Equipment for the Steel Industry

Wide Range of Motors for main mill and auxiliary equipment drives—ac or dc—from 1 hp to 10,000 hp—and supporting m-g sets or rectifiers.

Transformers for mill service include metering transformers, distribution transformers, power transformers, and unit substations.

Switchgear ranges from low voltage metal-enclosed units to large metal-clad types — includes *Ruptair* and oil circuit breakers. Also large power circuit breakers.

Blast Furnace Blowers are a part of the A-C line of single and multi-stage blowers, axial and rotary compressors, and vacuum pumps for the steel industry.



Power Generation Equipment includes steam turbine-generator units 2000 kw and larger for fluctuating steel mill loads. Also condensers, pumps and auxiliary-drive motors.

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Production Pointers from GISHOLT

TIME-SAVING IDEAS

Presented as a service to production men, we hope some of these interesting ideas, chosen from thousands of jobs, will suggest ways to help cut time and costs in your own work.

MASSIVE FLYWHEELS COMPLETED IN ONE AUTOMATIC OPERATION

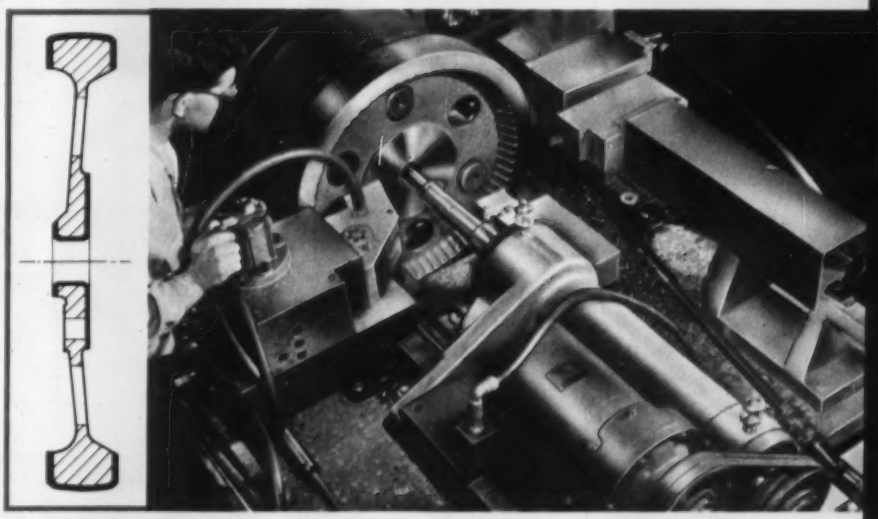
Simplimatic Automatic Lathe and Balancer Team Up to Drive Down Costs

All machining on this 320-lb. cast-iron hay baler flywheel is completed in one chucking on this Gisholt Simplimatic Automatic Lathe. The part is chucked in three cored holes in the web. V-grooves in the chuck jaws centralize the work and give a true-running web. Spring-loaded jacks provide support and eliminate vibration.

Four front slide tools straddle face the rim, face the center pad and chamfer the back edge. A cam-guided tool on the rear slide turns the OD crown and another tool chamfers the outer edge of the rim. Both slides have automatic tool relief. Two tools on a piloted speeder boring bar mounted on the center slide finish the bore and a third tool chamfers. A back boring attachment, operating through the spindle, completes the job by shave facing the back pad and chamfering the bore. Eleven tools machine ten surfaces in seven minutes f.t.f.

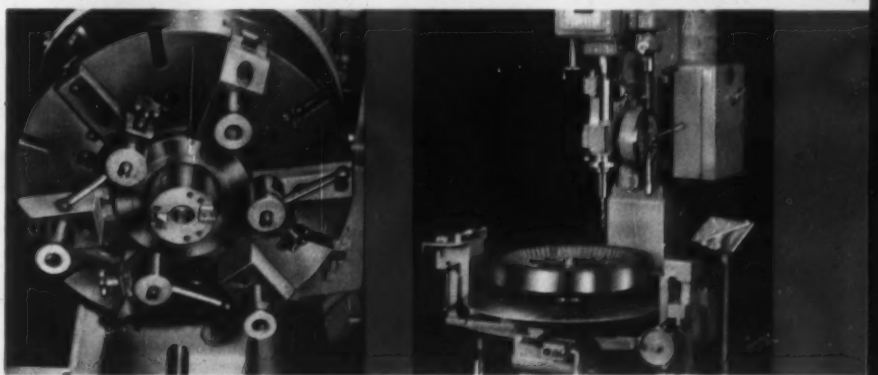
While a new workpiece is being machined, the operator places the completed part in a Gisholt 14E Static Balancer. This is arranged with correction equipment so that unbalance can be measured, located, corrected and inspected in one handling.

From rough casting to machined and balanced flywheel—all done by one operator and the two Gisholt machines.



Heavy lines show ten surfaces machined in one chucking.

Close-up of workpiece and tooling. Note speeder boring bar arrangement to give required cutting speed in small bore diameter.



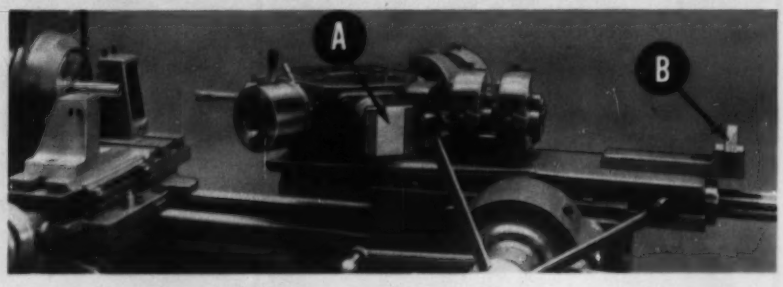
V-grooved chuck jaws and spring-loaded jacks. Back boring attachment tools feed out through the spindle to face back pad and chamfer bore.

Gisholt 14E Static Balancer with integral correction equipment. Up to 600 ounce-inches of unbalance can be quickly measured.

TIME-SAVING IDEAS

HOW TO DO LONG SHAFTS ON SHORT LATHE

Ram Type Machine Shows How Good Idea Can Save on Equipment Costs



The long and short of this pointer is worth remembering the next time you have a problem like it.

Here, a Gisholt No. 4 Ram Type Turret Lathe, which has 25¾ inches from hexagon turret face to spindle, is handling a 46⅛-inch-long shaft. The seamless steel tubing is fed through the spindle and locates against stock stop "A" for simple turning, reaming, necking and threading operations. Then the hexagon turret is indexed so that stop "A" again faces the work. The stop is hinged and flips up, permitting the bar stock to pass completely through the turret and locate against stop "B." The body of stop "A" acts as a steady-rest to prevent whip while the shaft is cut off to length from the rear tool post on the cross slide. Stop "B" then also swings out of the way for easy removal of the finished shaft. The whole job takes only 2.75 minutes floor-to-floor.

By simply allowing the workpiece to pass through the hexagon turret, a shaft nearly twice the length of the machine's capacity can be handled—sparing the need for a larger, more costly lathe.

TURRET-MOUNTED LOADER SPEEDS CHUCKING

Gisholt Fastermatic Automatic Turret Lathe uses Loading Arbor to Save Time and Effort.

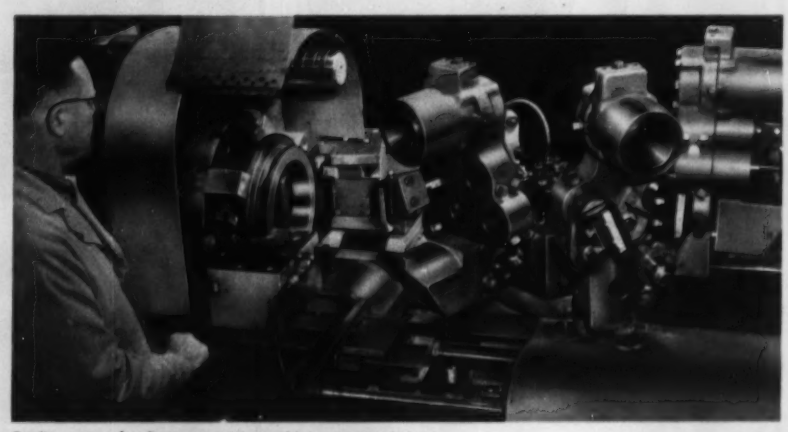
Even if you have your machining time down pat, you may still be able to cut over-all time further with a better loading method.

Here, to simplify and speed up chucking operations, this 2F Fastermatic has a special turret-mounted loader arrangement. As each machine cycle ends, the finished part is removed. Then forward movement of the hexagon turret carriage brings a rough workpiece on the loading arbor to the chuck. Spring-loaded studs on the arbor force the piece against the chuck jacks to locate the work.

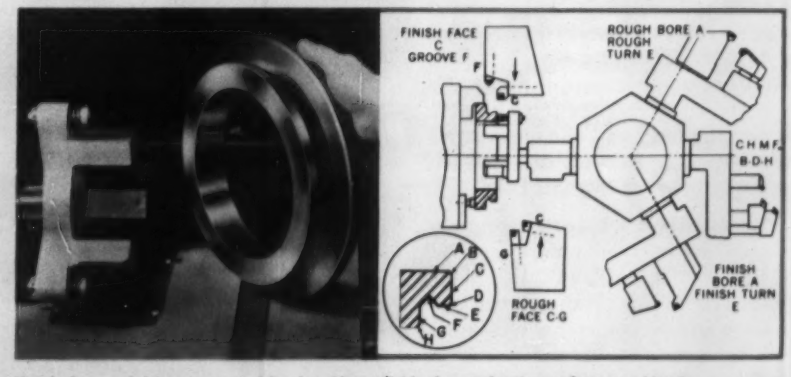
With simplified loading and chucking and a fully automatic machine cycle, time is just 6.9 minutes f.t.f.

The hexagon turret stations are tooled to turn, bore and chamfer with all facing and grooving operations on the steel rings performed from the front and rear cross slides.

Using a loading arbor on one turret face of the Fastermatic Automatic Turret Lathe reduces manual effort and simplifies chucking.



Tooling setup for first operation machining on steel rings.



Here's the special turret-mounted loader. Also a finished part showing surfaces machined.

GISHOLT

TIME-SAVING IDEAS

AUTOMATIC LATHE DOUBLES AT SUPERFINISHING AND BEARINGIZING

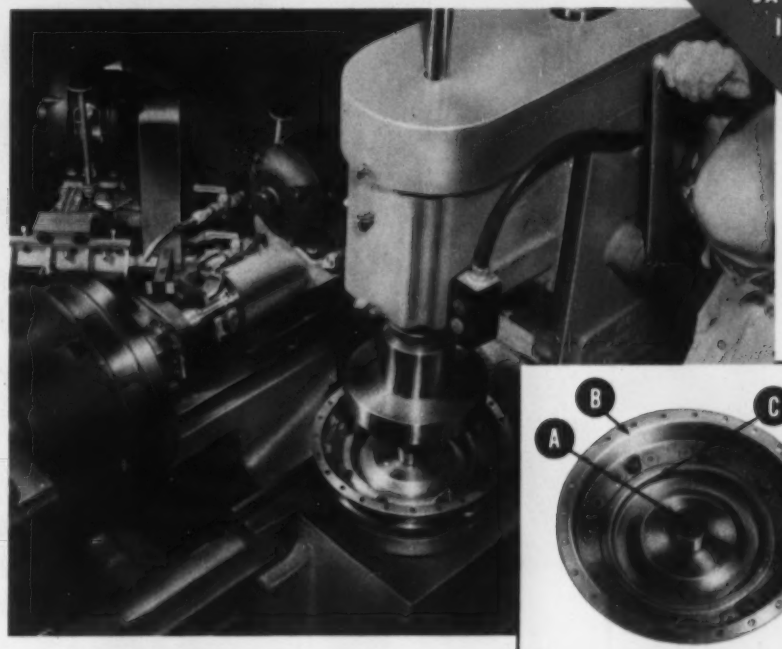
Gisholt No. 12 Hydraulic Lathe Adapts for Special Work

For many of those special jobs that come along present equipment can lend a hand. This unique application of a Gisholt No. 12 Hydraulic Lathe, where three jobs are performed in one handling, is a good case in point.

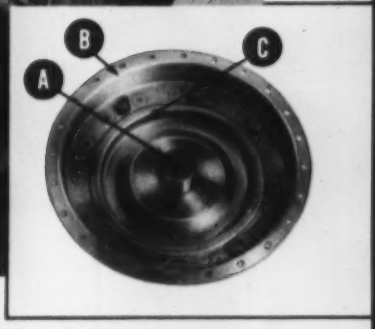
Here, it is specially tooled to finish automotive transmission converter clutch housing and bushing assemblies. Two No. 1 Superfinishing attachments are mounted on the rear independent slide. One Superfinishes the flat hub face (A) of clutch housing for thrust washer contact. At the same time the 45-degree sealing face (B) is also Superfinished.

While this part is being Superfinished, the preceding workpiece has its 8-inch bore (C) sized and finished by a vertical Bearingizer unit, also mounted on the No. 12 Hydraulic Lathe.

Production is fast—over 50 parts per hour. Tolerances are closely held and the required "controlled" surface finish readings easily obtained.



By simple adaptation, this No. 12 Hydraulic Automatic Lathe performs as a special machine to produce Superfinished and Bearingized parts.



To show tooling, Superfinishing quills are withdrawn, Bearingizer unit is raised. While part is Superfinished, another is Bearingized.

THREAD-GRINDING WHEELS BALANCED FOR MORE PRECISE WORK

Gisholt DYNETRIC Balancer Measures, Locates Unbalance to Eliminate Harmful Vibration

Thread-grinding wheels operate at high speeds and therefore must be very accurately balanced to eliminate vibration which would hamper grinding to close tolerances. For this type of workpiece, where the length along the axis is small compared to the diameter, correction is usually made only for force (static) unbalance.

For fast, simple, low-cost balancing this Gisholt Type 3S DYNETRIC Balancing Machine is used. It is easily set up to measure and locate force unbalance. The strobe lamp flashes on the numbered band and indicates which of the tapped holes provided in the mounting flange plate will receive the correction weight. At the same time, the amount meter tells the operator exactly which weight screw is to be added to bring the part into precise balance.

By eliminating vibration, grinding wheels rotate very smoothly and produce better threads to closer tolerances.

Balancing, performed on new wheels and after dressing old wheels, assures accuracy and improves performance.

DYNETRIC BALANCERS GISHOLT

Complete courses covering all phases of precision balancing are offered by the *Gisholt Balancing School*. Get details and starting dates.

For A Clear Picture . . .

of the various plans under which you can acquire new machine tools, you'll find this a very helpful booklet. It explains and illustrates time-buying and leasing methods to show how you can benefit from these methods. Write for Booklet P-1173.

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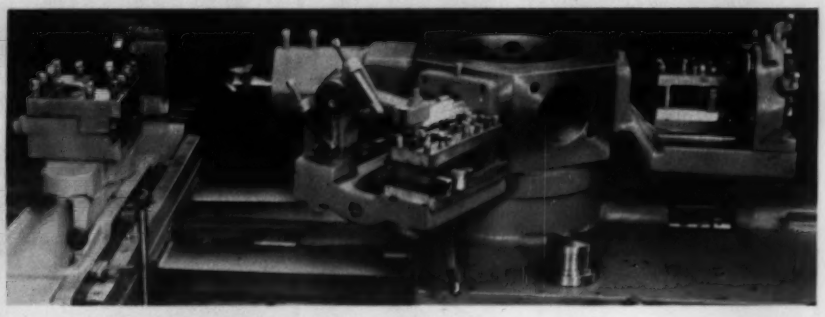
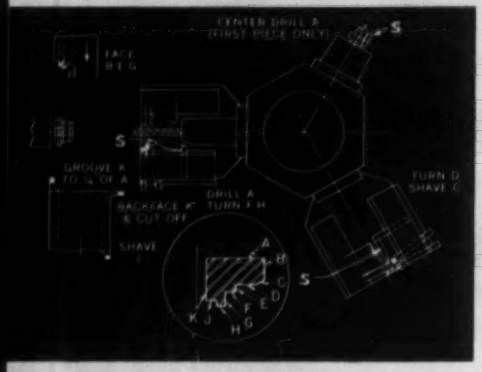
TIME-SAVING IDEAS

MULTIPLE TOOLING ANSWERS SMALL LOT PRODUCTION



This tooling arrangement makes an ideal setup for the various machining operations shown in the layout. As few as five pieces per lot are handled economically this way.



Saddle Type Lathe Produces Coupling Hubs Faster, More Accurately

Here a standard Gisholt 3L Saddle Type Turret Lathe is multiple tooled with lots as few as five pieces handled economically. The lathe is equipped with a bridge-type cross slide and is tooled to machine steel flexible coupling hubs from bar stock.

All tooling for the several different sized parts is pre-set. This includes the group of tools on the rear of the cross slide and also the special tool blocks held in the multiple cutter turners on the hexagon turret. To go from one part size to another, the operator merely changes these special tool blocks and adjusts the multiple cutter turner rollers. Special stops "S" on turret tooling determine the length of all turned diameters and shoulder positions directly from the end of the piece. These stops eliminate the time required to set turret stops. Also, a stock stop to position the work prior to starting machining operations is not required.

With this kind of interchangeable pre-set tooling on Saddle Type Turret Lathe, you have a high-production setup which can be used for small lots.

HOW SPOT CHECKING SAVES TIME ON SUPERFINISHING JOBS

Inspection Equipment on Machine Speeds Small Lot Operations

Operator is checking surface finish reading with inspection equipment mounted on Gisholt 51A Superfinisher.

Superfinishing, as you may know, is the process whereby a "controlled" surface finish can be quickly and economically obtained, piece after piece —whether the specified final finish is 50, 30, 10 or 1 micro-inch RMS.

In small job shop operations, various parts are handled and finish requirements vary considerably. This necessitates some means by which the operator can determine when he has produced the specified surface finish on a part.

This standard Gisholt 51A Superfinishing Machine is equipped with a Profilometer Unit. This provides a means of instant checking the surface roughness of the part being Superfinished at any time during the Superfinishing operation. The part doesn't have to be removed. It's possible to Superfinish each individual part to the blueprint tolerance before leaving the machine.

Superfinishing is made even more efficient and lower cost with this means of keeping a "running" check on surface roughness. It's ideal for handling small lots and where different surface finishes are specified.

Write for book, "Wear and Surface Finish" which gives full information on Superfinish.

No. 5-655
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THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

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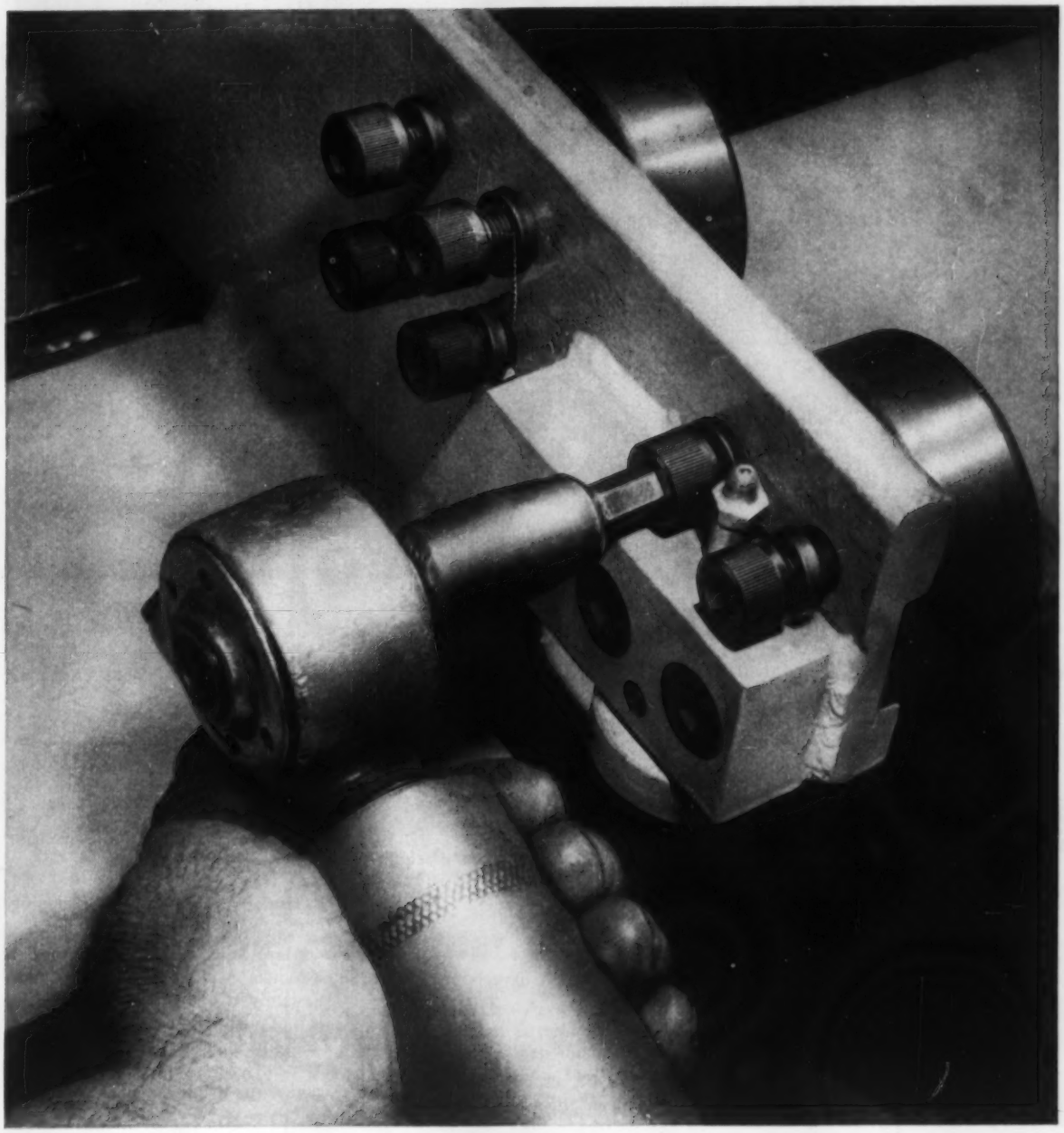
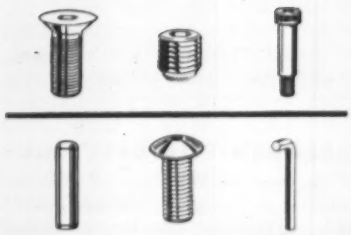




UNBRAKO SOCKET HEAD CAP SCREWS provide additional safety and increased efficiency on industrial lift trucks. Sixteen of them are used to fasten the side thrust fork carriage rollers which reduce the stresses caused by off-center loading. These standard UNBRAKOS have heads forged for strength, and sockets of uniform depth and size for strength and maximum torque in wrenching. Fillets and threads are formed to provide continuous grain flow throughout the screw. For the UNBRAKO story, see your authorized industrial distributor. Or write STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

UNBRAKO SOCKET SCREW DIVISION SPS JENKINTOWN, PENNSYLVANIA

(Advertisement)

How the Steel Industry Is Fighting Air Pollution

When the public hears about dust and fume control it is often in terms of what has *not* been done. It is important that they should also know what *has* been done, because the record of the steel industry is one of the most progressive.

The purpose of this discussion is to give the executives the facts to prove this point.

Q. *First of all, how can you measure the progress of dust and fume control in the iron and steel industry?*

A. As you know, there are many ways to combat air pollution. Equipment and methods vary in effectiveness, but the industry agrees that electrical precipitators have the highest collection efficiencies. By keeping track of the demand for this high efficiency equipment over the years, we can get a good indication of the importance the industry places on dust and fume control and the progress they are making.

Q. *Do these figures show an increasing interest in this high efficiency equipment?*

A. Suppose we let the figures speak for themselves. Since 1945 precipitator capacity in the steel industry had a greater increase than in any previous ten year period. Precipitators handling about 6½ million cfm were installed during this period.

Q. *But can't you attribute this growth to the increase in steel-making capacity?*

A. Some of this growth is due to expanded production facilities, but that's just a part of it. For instance, iron and steel production has increased about 30% since 1945 — but precipitator capacity has increased about 130% during this same period.

Q. *In the old days, I guess precipitators were used primarily in blast furnaces, weren't they?*

A. That's right. The first one went into operation in 1930. Since then, 169 Research Cottrells have been ordered by the industry.

Q. *What about new applications?*

A. We have a number of new uses that have proven themselves on the job. Open hearths, for instance. In one installation, our precipitators reduced stack discharge to a little over 2 pounds per hour. That's quite a reduction when you consider that the discharge without a precipitator ranged from 75 to 245 pounds per hour.

Q. *I understand your Cottrells are used on some sintering machines now. Is this true?*

A. Yes, we have three in operation and more under construction.

Q. *How about scarfing machines?*

A. This is a recent application which has worked out very satisfactorily. Two precipitators are now in operation on this application.

Q. *Has anything been done on such problems as iron cupolas, electric furnaces, and ferromanganese blast furnaces?*

A. Yes. Installations have been made on all these problems.

Q. *How do you go about developing these new applications?*

A. We work very closely with our customers on these new projects. Our laboratory is a big help, and our 40 years of pilot plant experience plus over 2,000 precipitators give us the kind of experience that leads to the successful engineering of projects like these.

If you would like to have more information about these applications, or if you want to investigate the possibility of using precipitators on other equipment, our nearest representative will be glad to call on you.

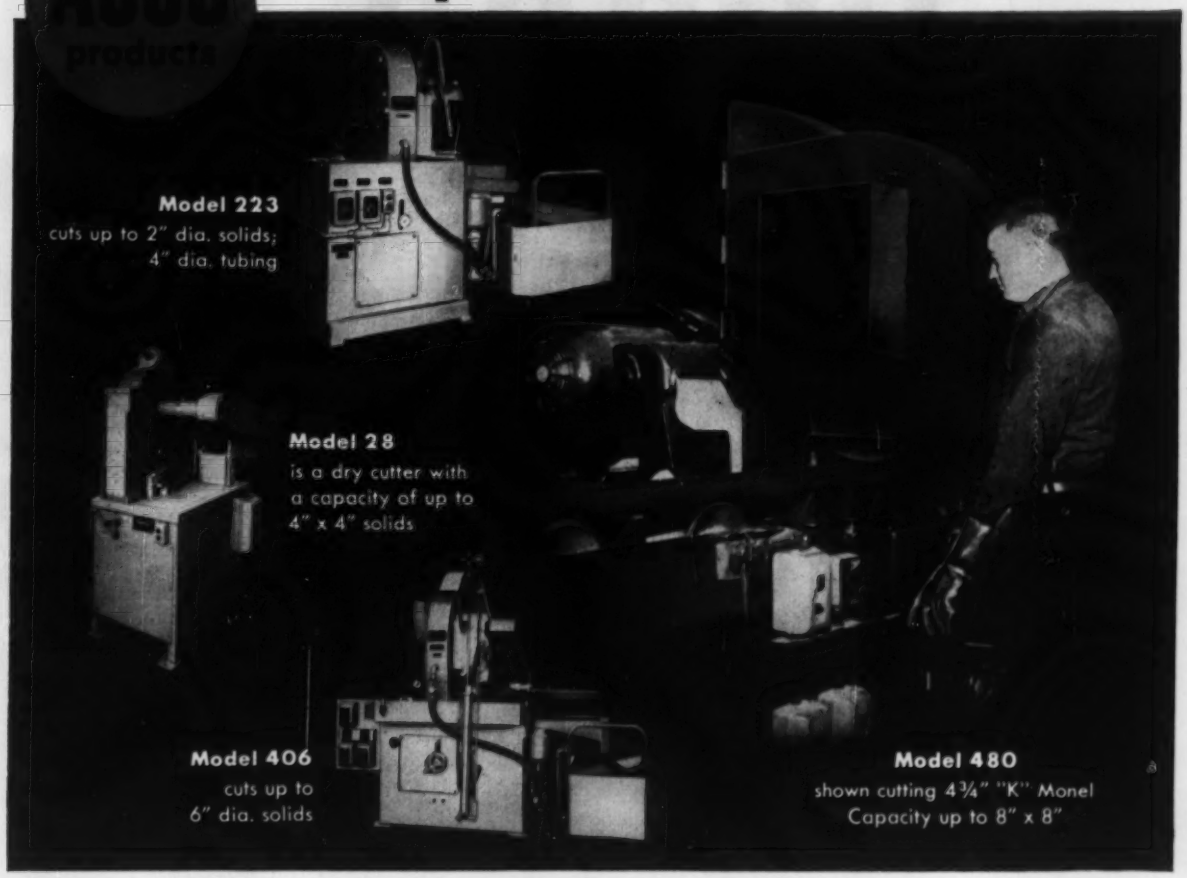
RESEARCH-COTTRELL, INC.

A Wholly Owned Subsidiary of Research Corporation

MAIN OFFICE AND PLANT: BOUND BROOK, N. J.

405 Lexington Ave., New York 17, N. Y. Grant Building, Pittsburgh 19, Pa. • 228 N. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Cal. RC158

Campbell Abrasive Cutters



Cuts alloy and high carbon steel quicker, smoother and more economically

• Faster cutting of alloy and high carbon steel stock by CAMPBELL Abrasive Cutters—much faster than by other methods—reduces your labor costs and the number of machines required.

But that's only a start on the savings that the CAMPBELL abrasive cutting method makes possible. Large savings of materials result from the close tolerances, smooth finish and straight cuts with CAMPBELL cutters. Finishing time and costs are reduced as these machines cut all kinds of stock without surface hardening and with smooth finish.

CAMPBELL offers you the widest range of plus-services—

Superior sales engineering services—CAMPBELL experts are fully experienced in every type of cutting problem. They will help you select the machine best fitted to your requirement. They are available for consultation on cutting problems at any time.

Economy and speed of operation—CAMPBELL Abrasive Cutters handle every type of cutting job with accuracy, efficiency and economy. The big MODEL 480, for instance, cuts 4¼" diameter "K" Monel in two minutes per cut. The small MODEL 28 takes approximately 3 seconds per square inch of material.

Complete line of standard machines—It pays to select from a complete line. Only then are you sure that the abrasive cutter you buy is the one most profitable for your job. CAMPBELL Abrasive Cutters have many exclusive features. They are available as fully or semi-automatic equipment.

Consultation with trained CAMPBELL engineers will cost you nothing. It may show how to increase output per man hour.

Write for Bulletin DH-301 on "The Principles of Abrasive Cutting"

ACCO

Campbell Machine Division
AMERICAN CHAIN & CABLE

925 Connecticut Avenue, Bridgeport 2, Connecticut

Wet and Dry Cutters and Grinders

Jumbo die

• Short, special purpose, removable upper brackets.

• Large area, removable upper brackets.

CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

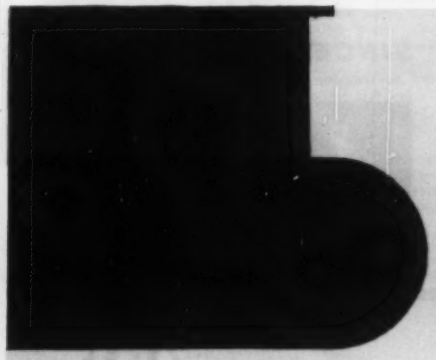
areas . . .

on Cincinnati Press Brakes

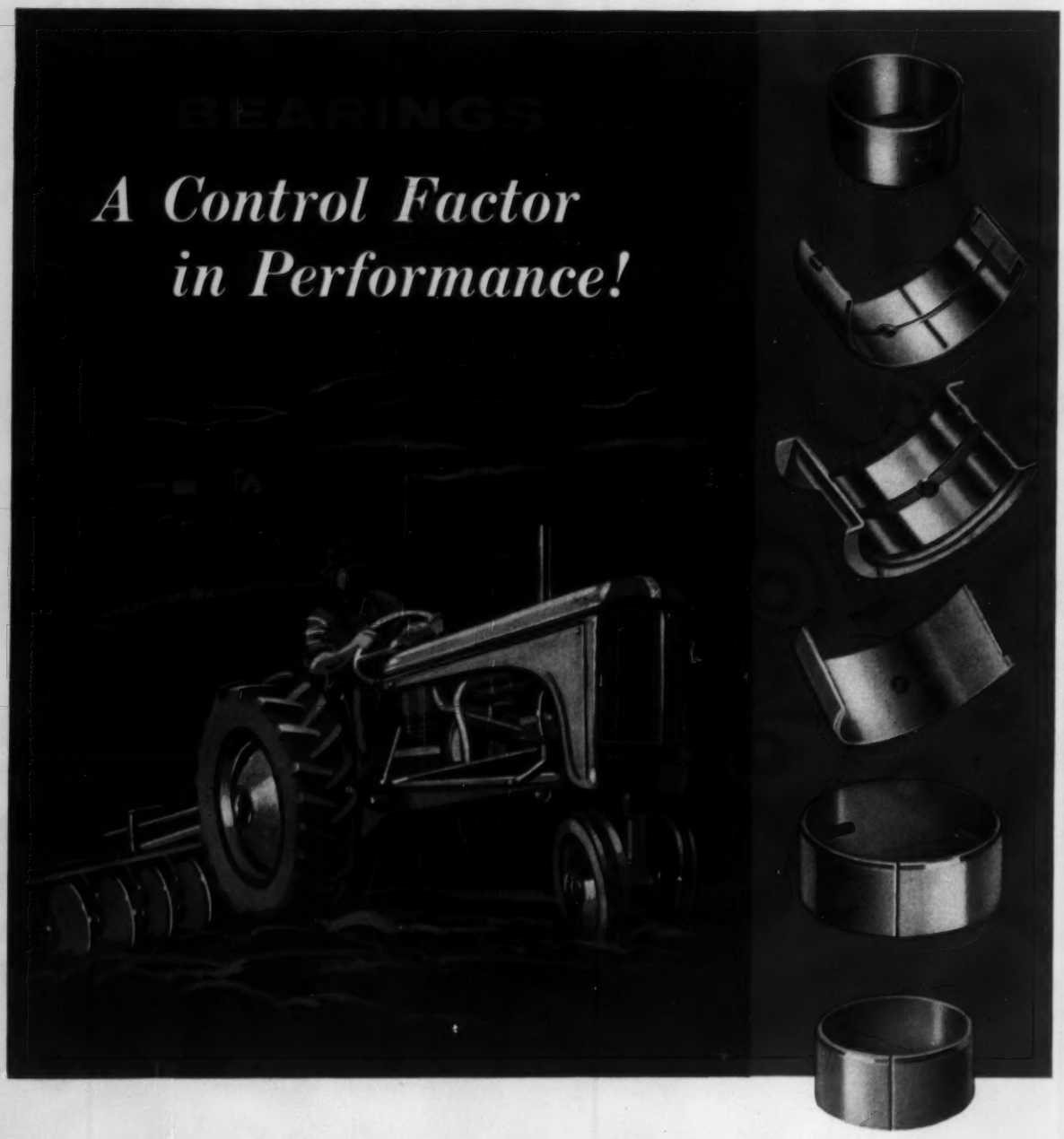
More and more jobs are being done on versatile Cincinnati Press Brakes. Removable or fixed brackets with large die areas permit many jobs to be done both in the Press Brake and Press fields. When dual purpose performance is required removable brackets are used—for Press work only, fixed brackets are furnished. Brackets are designed to sizes desired.

• Large area, permanent wide bed and ram for press work.

• Large area, removable upper and lower brackets.



Investigate! Our Engineering Department will be glad to advise you on the profit and production possibilities in your shop. Write for Catalog B-4.



RESEARCH • DESIGN • METALLURGY • PRECISION MANUFACTURING

Farm tractors give engine bearings a tough test. It's a matter of heavy-load engine operation through long hours in dusty fields . . . and the bearings *have to "take it!"* For quality and dependability, Federal-Mogul engine bearings and bushings are used by many leading manufacturers of farm tractors. Our engineers have specific answers to such application problems. Your inquiry is invited. Federal-Mogul Corporation, Detroit 13, Mich.

SINCE 1899

FEDERAL-MOGUL

CALENDAR
OF MEETINGS

May 15-18, Copper & Brass Research Association: Annual meeting, the Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: F. L. Riggin Sr.

May 15-18, Industrial Heating Equipment Association Inc.: Spring meeting, the Homestead, Hot Springs, Va. Association's address: 412 Fifth St. N.W., Washington, D. C. Executive vice president: Carl L. Ipsen.

May 16-17, American Management Association: Special conference on collective bargaining, Commodore hotel, New York. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

May 16-19, American Mining Congress: Coal convention and exposition, Cleveland Public Auditorium, Cleveland. Congress' address: 1102 Ring Bldg., Washington 6, D. C. Executive vice president: Julian D. Conover.

May 16-20, Materials Handling Exposition & Conference: International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

May 18-20, Porcelain Enamel Institute: Mid-year division conference, Edgewater Beach hotel, Chicago. Institute's address 1346 Connecticut Ave. N. W., Washington 6, D. C. Secretary: John C. Oliver.

May 19-20, National Industrial Conference Board Inc.: General session for all associations and 39th annual meeting, Waldorf-Astoria hotel, New York. Board's address: 247 Park Ave., New York 17, N. Y. Secretary: Herbert S. Briggs.

May 19-20, Refractories Institute: Annual meeting, Cavalier hotel, Virginia Beach, Va. Institute's address: First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: A. C. Newton.

May 22-24, American Steel Warehouse Association: Annual meeting, Hotel Statler, Boston. Association's address: 442 Terminal Tower, Cleveland 13, O. Secretary: Walter S. Doxsey.

May 23-25, American Management Association: General management conference, Roosevelt hotel, New York. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

May 23-25, American Society for Quality Control: Annual meeting and exhibit, Hotel Statler, New York. Society address: 50 Church St., New York 7, N. Y. Executive secretary: C. Eugene Fisher.

May 23-26, Machinery Dealers National Association: Annual convention, Netherland Plaza hotel, Cincinnati. Association's address: 1346 Connecticut Ave. N. W., Washington 6, D. C. Executive director: R. K. Vinson.

May 23-26, National District Heating Association: Annual meeting, Edgewater Beach hotel, Chicago. Association's address: 827 N. Euclid Ave., Pittsburgh 6, Pa. Secretary-treasurer: John F. Collins Jr.

May 23-28, American Foundrymen's Society: Annual meeting, Rice-Shamrock hotel, Houston. Society's address: Golf & Wolf Rds., Des Plaines, Ill. Secretary: William W. Maloney.

May 25-26, American Iron & Steel Institute: Annual meeting, Waldorf-Astoria hotel, New York. Institute's address: 350 Fifth Ave., New York 1, N. Y. Information: Frank Ragland.

May 30-June 1, National Association of Purchasing Agents: Annual meeting and exhibit, Waldorf-Astoria hotel, New York. Association's address: 11 Park Place, New York 7, N. Y. Secretary: G. A. Renard.

May 30-June 10, Canadian International Trade Fair: Exhibition Park, Toronto, Ont., Canada. Information: Director of the Trade Fair, Exhibition Park, Toronto, Ont., Canada.

May 31-June 1, National Rivers & Harbors Congress: National convention, Mayflower hotel, Washington. Congress' address: 1720 M St. N.W., Washington 6, D. C. Executive vice president: William H. Webb.

You Get BIG savings on ...runs of ...parts

...from Western

This 4½" round alloy steel part has No. 12 pitch, class 3 fit internal threads, and requires 20 separate operations including pentrating and magnafluxing.

This 3¼" alloy steel part is hardened and ground. Tolerance of o.d. is just .0005".

This 4⅛" round part requires drilling, counterboring and recessing.

Ultra precision work is usually associated with small parts, but WESTERN is accustomed to .0005" tolerances on big parts, too—up to 4¾" round. As a matter of fact, we specialize in long runs of difficult, complicated parts and assemblies, and we deliver them the way you want them, when you want them.

Whether you're interested in big or small parts, plain or fancy, it pays to put WESTERN on your production team. We're equipped to do precision machining plus all finishing operations such as grinding, polishing, magnafluxing, heat-treating and pentrating.

You save money, time and trouble by getting quotations on precision parts from WESTERN. Write us today.

Western Automatic
Machine Screw Company
377 Woodland Ave., Elyria, O.

Precision Screw Products, Parts and Assemblies Since 1873

CLIFFS

...still produces the quality ore that constituted the... FIRST shipment through the 'Soo' in 1855

The New "Soo" Locks in 1955

The Old "Soo" Locks in 1855

"WOODEN SHIPS AND IRON MEN" has become the watchword of the American Merchant Marine, Navy and Coast Guard since 1812. It was a wooden ship that carried the first shipment of ore through the Saulte St. Marie in 1855 bound for the lower lake ports. Since that time "Iron Men" have paced American industry in ore mining, steel making, and the great fleets of vessels that ply the Great Lakes which carry the ore that has made America industrially great.

IRON ORE ★ ALLOYS ★ VESSEL TRANSPORTATION ★ COAL

The Cleveland-Cliffs Iron Company

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

"Bogey at 6,000 miles!"

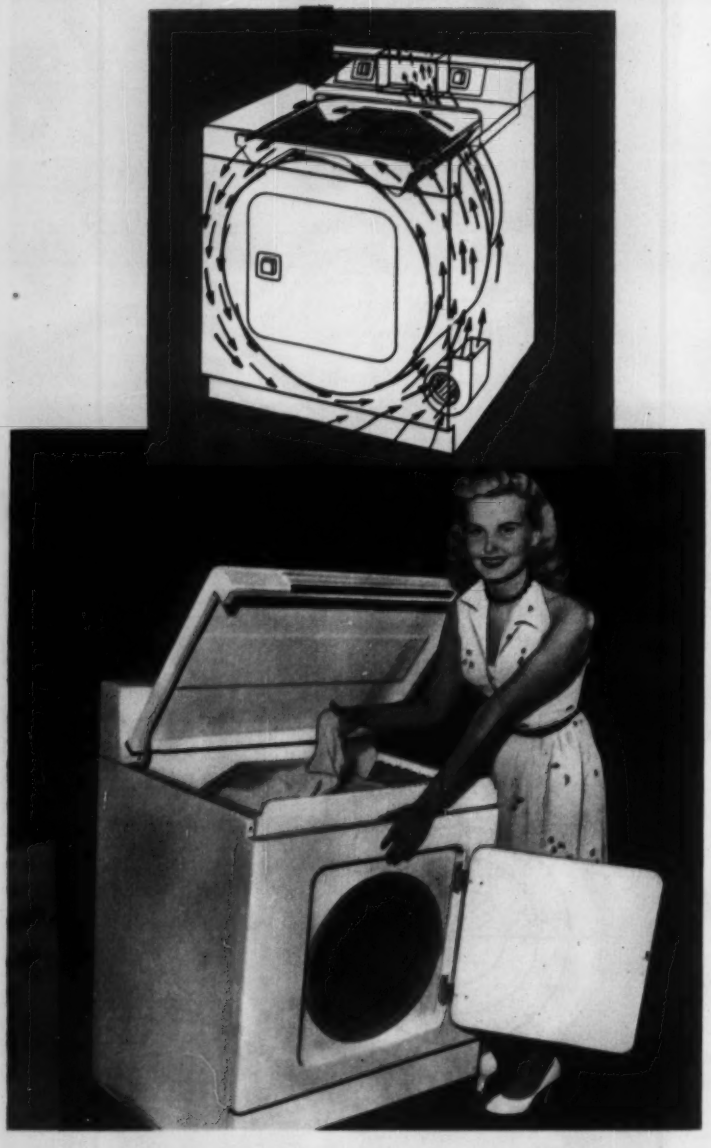
Sure, six thousand miles is beyond the range of today's radar equipment. But radar has been so highly developed since the end of World War II that who's to say how long it'll be until we're thinking in terms of thousands of miles . . . or more?

We're proud of the part we play in producing the world's most sensitive radar sets. Granted, it's a small part—*many* small parts—but our team of precision engineers, toolmakers and machinists makes certain that *If We Ship It . . . It's Right!* We work with practically every major builder of radar equipment—supplying the mounts on which the scanners turn, twist and probe. We're confident, too, that in the future, we'll continue to furnish component parts that will enable us to spot bogeys 'way out there—yes, even 6,000 miles away! For a book on our company—its facilities, its people and accomplishments—just write to: The Steel Products Engineering Company, Springfield, Ohio, and ask for our new Plant Brochure.

SPECO

THE STEEL PRODUCTS ENGINEERING COMPANY

How EXPANDED METAL helps dry delicate fabrics



Besides a tumble-dryer for normal laundry, the Rheem-Wedgewood clothes dryer has an exclusive *clothes-saver* feature. In this special compartment, formed from Penmetal expanded metal, precious nylons, fragile woolens and delicate synthetic fabrics may be dried safely in low temperature—without tumbling.

Penmetal expanded metal is ideal material for the *clothes-saver*. It is easily formed and welded; the strands are so smooth they will not damage delicate fabrics; and the open mesh allows the "fluff-breeze" to circulate freely. The diamond truss pattern adds strength to the metal; looks attractive, too, when the lid is up. Yet, Penmetal expanded metal is low in cost.

Penmetal expanded metal is available in carbon steel, aluminum, stainless steel, Monel, Inconel, and other metals. Large or small mesh. Light or heavy gauge.

Why not investigate? Penmetal expanded metal could provide a step toward a better product. Send for 28-page catalog which suggests uses for expanded metal, and gives mesh sizes, weights and dimensions.

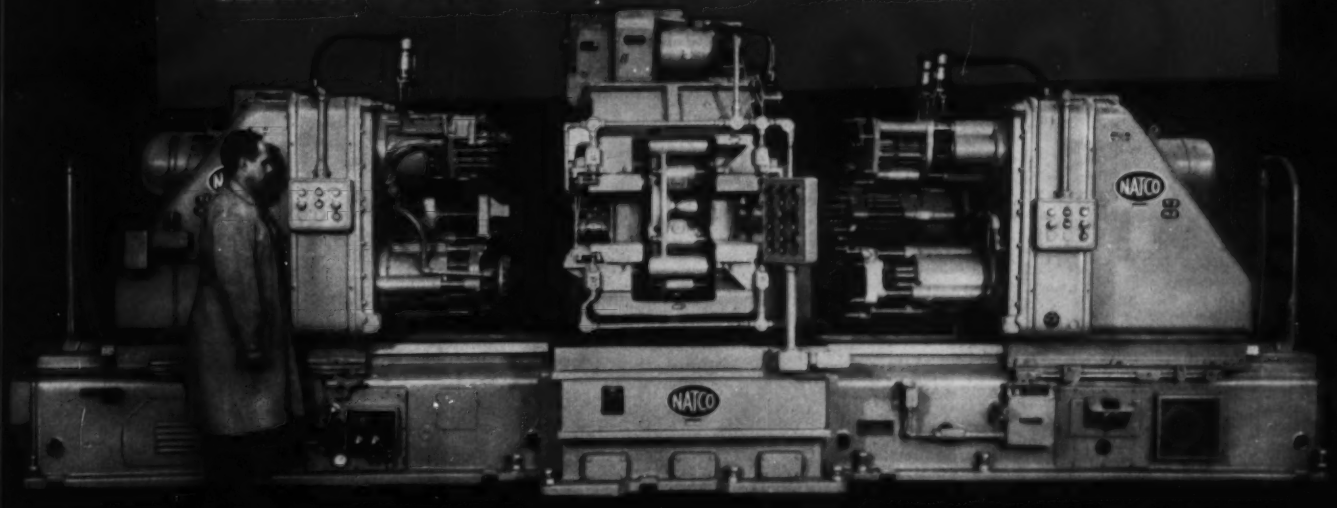
PENN METAL COMPANY, INC.
General Sales Office:
205 East 42nd Street, New York 17, N. Y.
Plant: Parkersburg, W. Va.

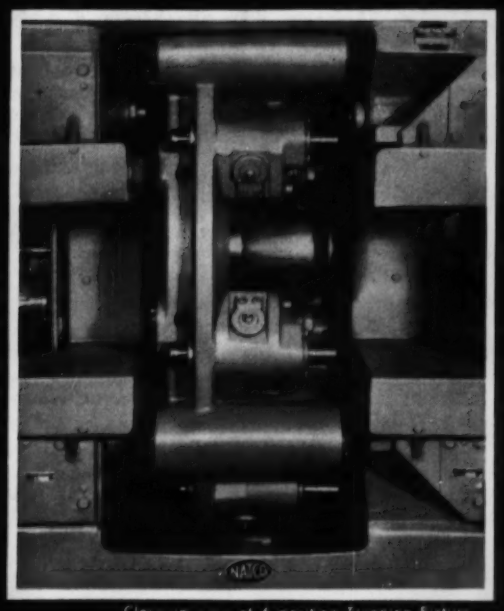
Penmetal
1869
QUALITY

These Palmaire electric heaters have Penmetal expanded metal grilles, with baked enamel finish. Made by Palmer Mfg. Corp., Phoenix, Arizona.

PM-70

COMBINING OPERATIONS on a NATCO Cut Costs and Increased Production!

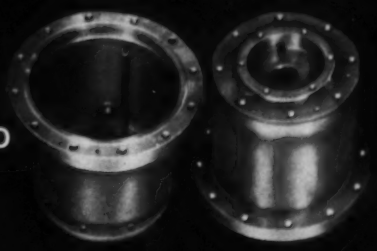




Close up view of 6 position Trunnion Fixture

109 REFRIGERATOR COMPRESSOR SHELLS PER HOUR

Estimated Gross Production



DRILLED
COUNTERBORED
REAMED, TAPPED
CHAMFERED
BURRED

Total . . . . . 77 OPERATIONS

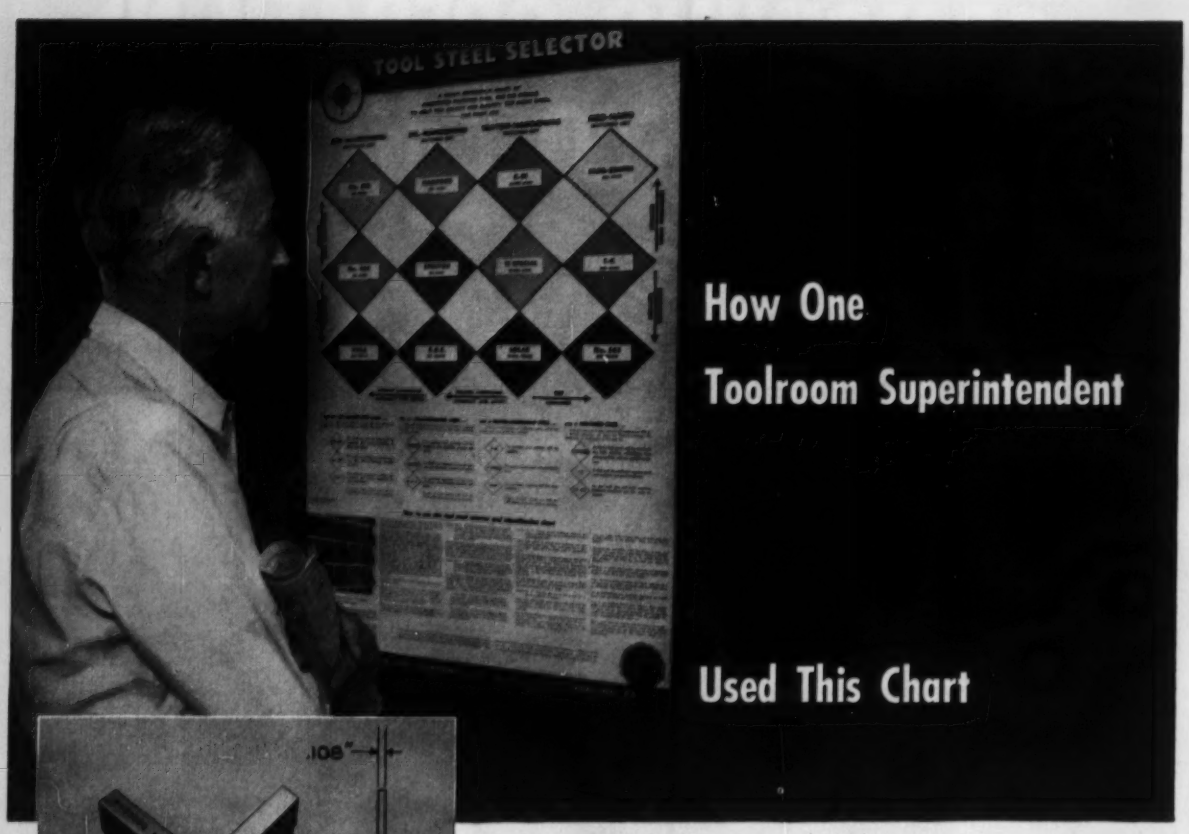
NATIONAL AUTOMATIC TOOL COMPANY, INC.
RICHMOND, INDIANA

for problems in Drilling, Boring, Facing and Tapping

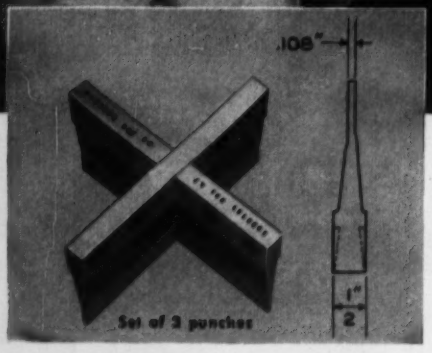
Call a Natco Field Engineer

CHICAGO, *Room 203, 6429 W. North Ave., Oak Park*
DETROIT, *10138 W. McNichols Rd.*
BUFFALO, *1807 Elmwood Ave.*
NEW YORK, *35 Beechwood Ave., Mount Vernon*

NATCO



How One Toolroom Superintendent Used This Chart



Job: A set of three special punches used on a high speed machine to close the joints on prefabricated metal window frames made from ⅛" thick SAE 1010 steel.

Problem: Many types and grades of tool steels were tried, but all lacked the necessary toughness and hardening safety. Best service life from any before breakage was three days. Because a set of 3 punches cost hundreds of dollars to make, the low production was hiking up operating costs at a prohibitive rate.

Solution: In a final effort to find a steel with enough toughness and safety in hardening, the Toolroom Superintendent turned to Carpenter and the Matched Set Method. Carpenter R.D.S. (Oil-Tough) was indicated.

Results: Now punches stay in service for about three months, and instead of breaking, they wear out in service.

. . . To Hold Down Operating Costs

In working with many men responsible for tools and dies, we've discovered a simple but often overlooked fact: The man who approaches each tool and diemaking job with the idea of . . . *Simplifying* it, *Reducing* heat treating hazards, and *Improving* previous performance . . . is bound to do a better job.

If you or your men have that approach, Carpenter wants to be of help. We like to think of our association with customers as a "partnership" in a mutual effort to get best possible results. And here's what we offer: Practical, *workable* help at *every step* from diemaking, to heat treating, through on-the-job performance.

And that's why it works . . . both of us have a common goal. Just one example of hundreds is found in the Field Report shown to the left.

One part of this program is the Carpenter Matched Set Method. It is an accurate blueprint for selecting the *one* die steel ideally suited to give you the results you want. It is all outlined in a convenient, full-color Wall Chart available to you.

And that's only a part of the program . . . a program that involves almost 70 years' experience in the development of new and constantly-improved die steels. We're ready to work for you, now. Simply call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.

Carpenter STEEL — Matched Tool and Die Steels

IMMEDIATE DELIVERY from local warehouse stocks

Export Department: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

HELICAL, TAPER, OR STRAIGHT involute splines like these are rolled in a few seconds. ROTO-FLO spline roller forms accurate splines up to thirty times faster at lower cost. (Bulletin RF-54.)

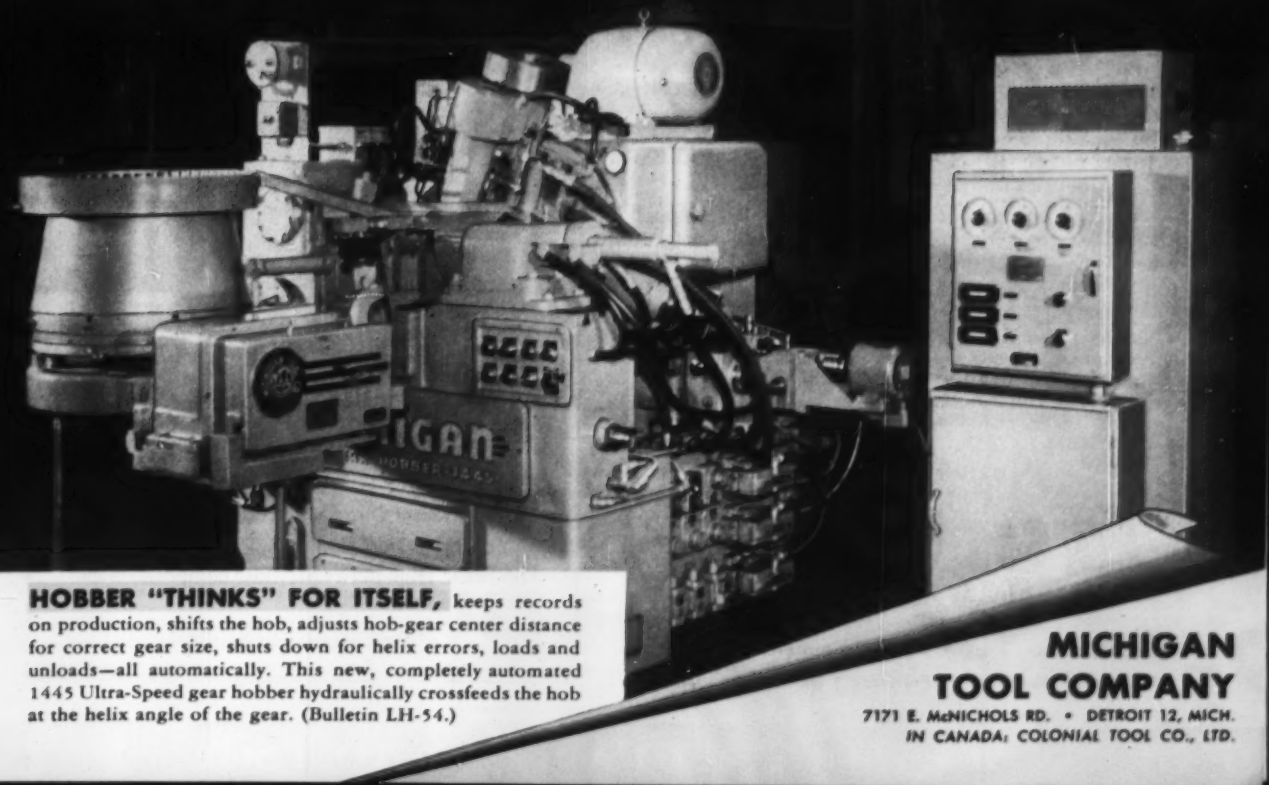
This Month's

GEAR PIX

GEAR DEVELOPMENT LABORATORY at Michigan Tool is dedicated to the task of helping gear manufacturers in their constant quest for better methods to make better gears at lower cost. Tooling and processes from blank to finished gear for both production and experimental gears are developed here.

MACHINE TOOL SHOW

AT CHICAGO — SEPT. 6 THRU 17



HOBBER "THINKS" FOR ITSELF, keeps records on production, shifts the hob, adjusts hob-gear center distance for correct gear size, shuts down for helix errors, loads and unloads—all automatically. This new, completely automated 1445 Ultra-Speed gear hobber hydraulically crossfeeds the hob at the helix angle of the gear. (Bulletin LH-54.)

MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.

IN CANADA: COLONIAL TOOL CO., LTD.

Get Extra Sub-hearth

SAFETY AND LONGER LIFE

with Kaiser Periclase D-S Brick

THIS superior brick has been *especially designed* to withstand sub-hearth conditions. Thus, it gives maximum protection against costly breakthroughs and provides longer sub-hearth life.

All the important properties outlined by major steel company ceramists as most desirable for sub-hearth brick are found in Kaiser Periclase D-S Brick.

High MgO (more than 95%) is achieved through the use of pre-shrunk, accurately-sized Periclase grains derived from sea-water magnesia. Absence of chrome eliminates the reduction of chromium oxide and damage to the refractory structure. (Brick contains only 0.8% Cr_2O_3.)

Low iron content minimizes refractory damage from alternate oxidation and reduction of iron oxide and other iron compounds. Absence of calcium oxide prevents damage caused by slaking during slow heat-ups or while furnace is idle. (Brick contains only 0.6% Fe_2O_3 and 1.2% CaO.)

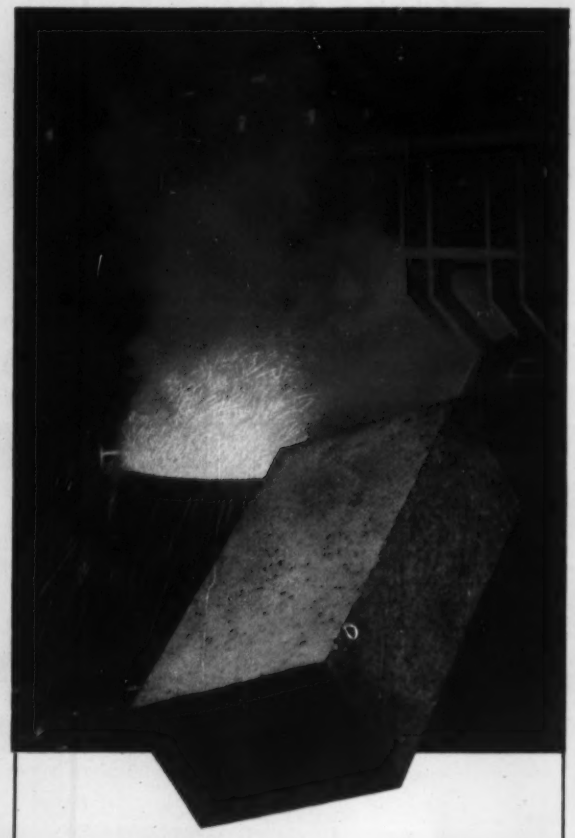
With all its many advantages, Kaiser Periclase D-S Brick gives you the ultimate in sub-hearth safety and durability—*yet costs no more!*

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . First National Tower,* AKRON *8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Brick • Ramming Materials • Castables & Mortars • Magnesite • Periclase • Deadburned Dolomite

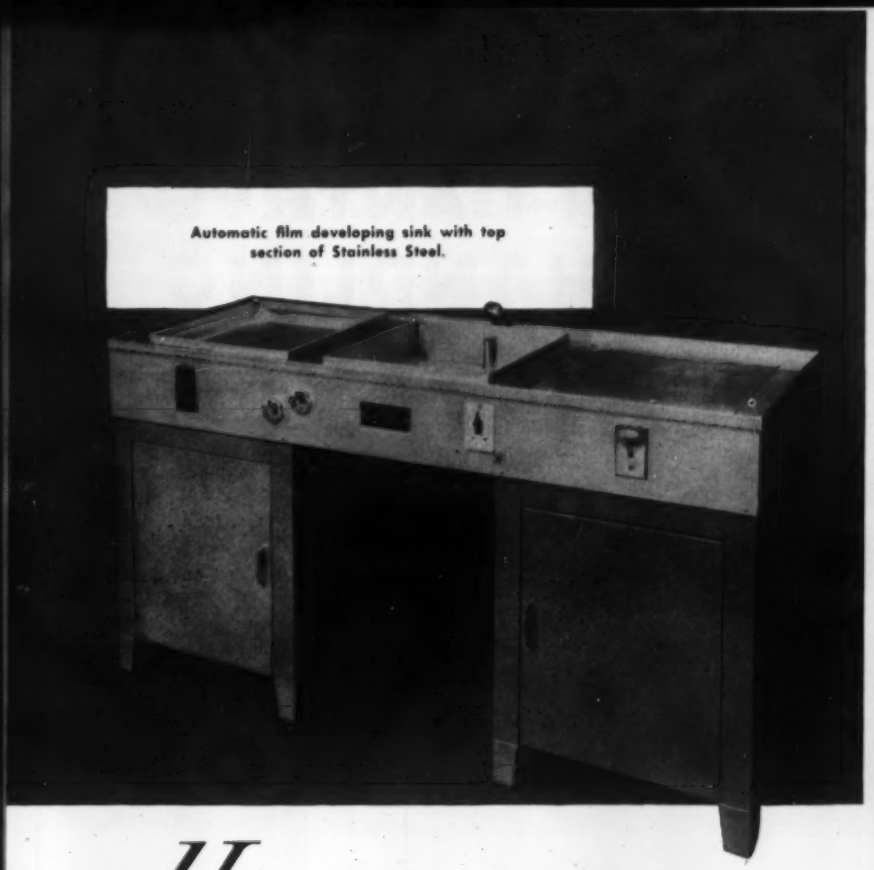


Kaiser PERICLASE Brick for the Steel Industry:

- Kaiser Periclase Brick (D-S)
- Kaiser Periclase Chrome Brick (PCA)
- Kaiser Chrome Periclase Brick (CPA)

Now available! A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.

Installation advice on request



Automatic film developing sink with top section of Stainless Steel.

Forming edges of top on 100-ton press brake.

Welding z-sections to underside of cooling tray.

How Stainless Steel helps make film developing automatic

DURABILITY, corrosion resistance and good looks are built into this automatic photographic developing sink through the use of Stainless Steel for the entire top section, including the two trays and the center bowl.

Metlmex Corporation, Lewistown, Pa., fabricator of this sink, makes a variety of products, working with both Stainless Steel and carbon steel. Fabricating equipment is used interchangeably with no special tools for working Stainless. The only difference in shop procedure lies in precautions taken to avoid marring the smooth surface of Stainless Steel.

Stainless Steel offers a unique combination of properties—plus ease of fabrication. It's the answer to a wide range of design problems. And when you use it, be sure you get service-tested USS Stainless Steel.

FABRICATING FACTS

Sheets are sheared to size in a 1/4" capacity squaring shear and edges are then formed on a 100-ton press brake.

Front, sides, bowl and trays are assembled to form a complete integral stainless steel top unit. Metallic-arc, heliarc, and spot methods are employed in welding temperature controlled trays and cabinets. Developer and fixing trays are attached to unit by riveting one side to stainless steel hinge permitting mechanical agitation.

Stainless steel panels are easily lock seamed to form center bowl section.

After assembly, entire unit is ground and polished to remove weld marks.

SEE THE UNITED STATES STEEL HOUR.

It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
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USS

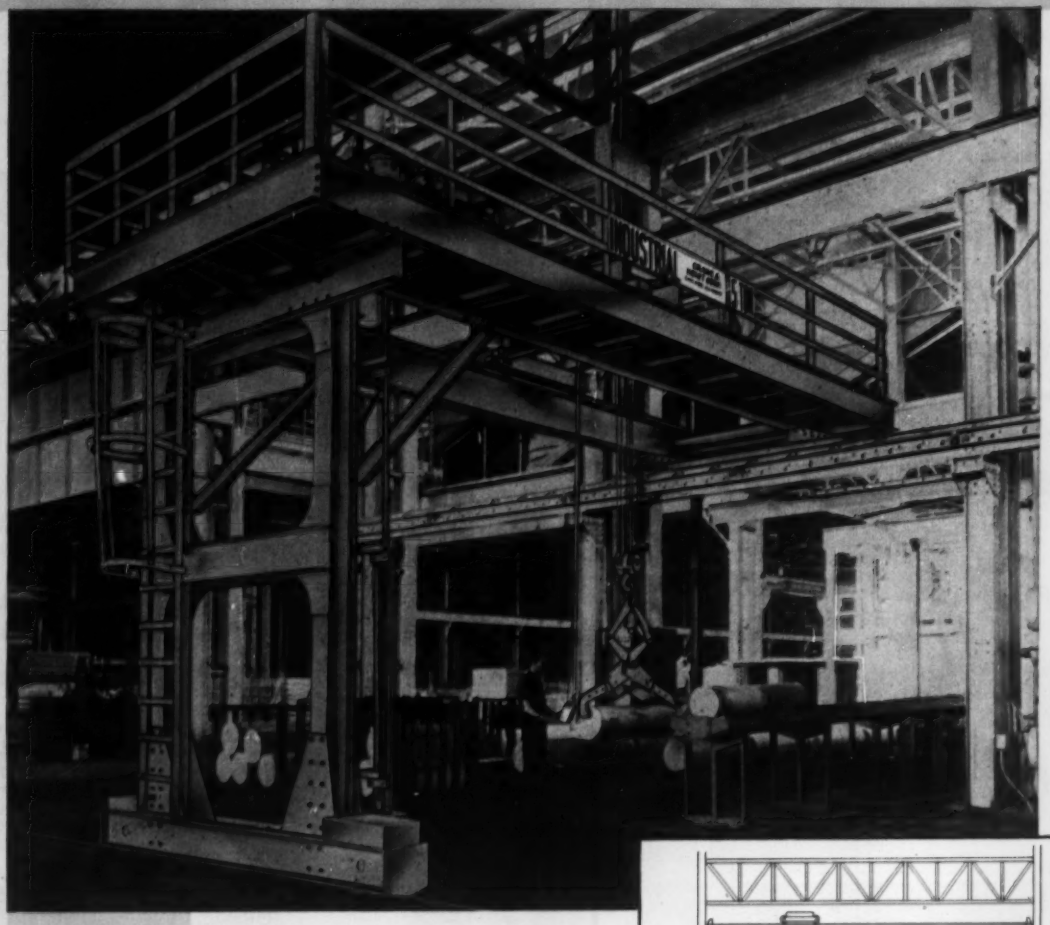
USS STAINLESS STEEL

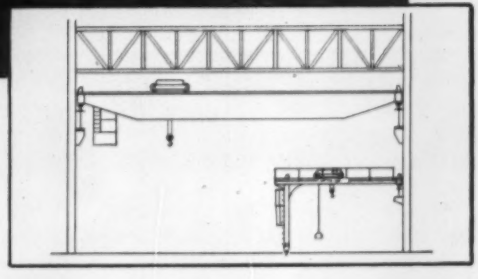
SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

S-496

UNITED STATES STEEL

Industrial SEMI-GANTRYS SPEED BILLET HANDLING





The diagram illustrates the relative positions of the Industrial Semi-Gantry and the heavy capacity overhead crane, both of which operate without interfering with each other.

Industrial CRANES

An Industrial motorized Semi-Gantry does a production job handling billets from racks to a conveyor in a large metal plant.

Serving a local area in the factory the Industrial Semi-Gantry operates on its own runway—freeing the heavy capacity overhead crane for other important jobs, resulting in overall savings in operation and maintenance.

Consult with Industrial Crane & Hoist Corporation for an economical solution to your materials handling problems.

INDUSTRIAL CRANE & HOIST CORPORATION

1503 SOUTH PAULINA STREET **CHICAGO 8, ILLINOIS**

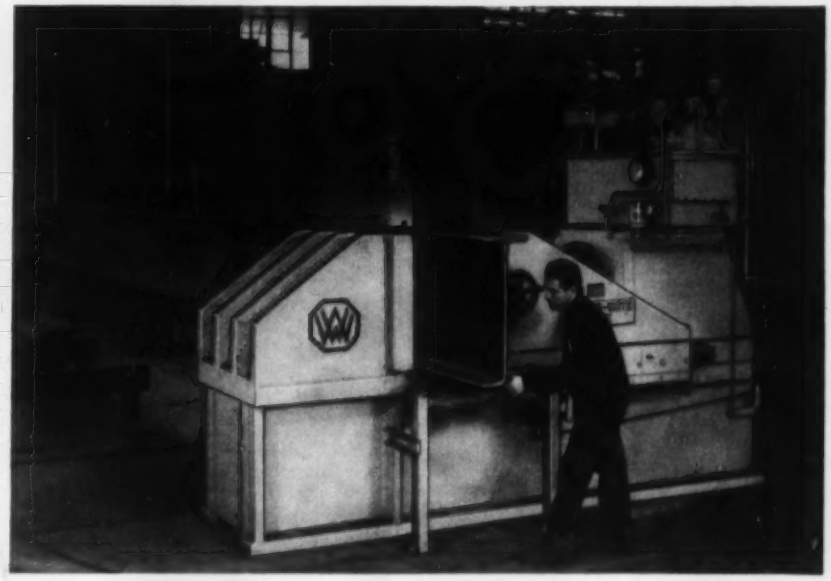
Overhead Cranes • Jib Cranes • Monorail Systems • Crane Runways
Representatives in Principal Cities

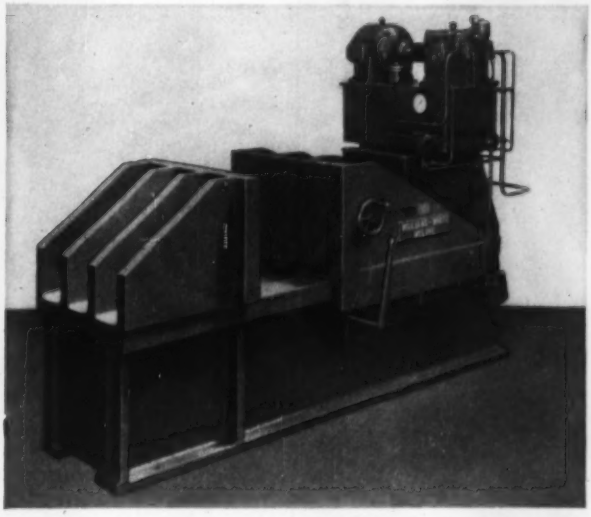
SG 1054 C

WILLIAMS-WHITE
Horizontal Bender and Straightener

The versatility of the horizontal press is well represented by the 200 Ton Hydraulic Bender and Straightener illustrated, in the installation view at right. The 30" x 48" crosshead and end lug make this an excellent machine for straightening I-beams, channels and other sections.

The forward travel of the crosshead is adjustable by the handwheel mounted on the side of the crosshead. In the event the stroke is not sufficient to complete the desired bending or straightening operation, the operator merely turns the handwheel and the crosshead continues forward a distance proportionate to the movement of the wheel.





WILLIAMS-WHITE & COMPANY machinery is custom built to your specifications! Our designers and engineers are at your service, without obligation, to help you select capacity and type of machine most suited for your requirements. For more information consult your WILLIAMS-WHITE & CO. representative or write us direct.

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E. E. WOOD MACHINERY CO.
Detroit, Mich.

PAGEL MACHINERY COMPANY
Milwaukee, Wis.

SEIFREAT-ELSTAD MACHINERY CO.
Cincinnati, Columbus and
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EDWARD A. LYNCH MACHINERY CO.
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GEORGE A. DAVIES, Jr. MACHINERY CO.
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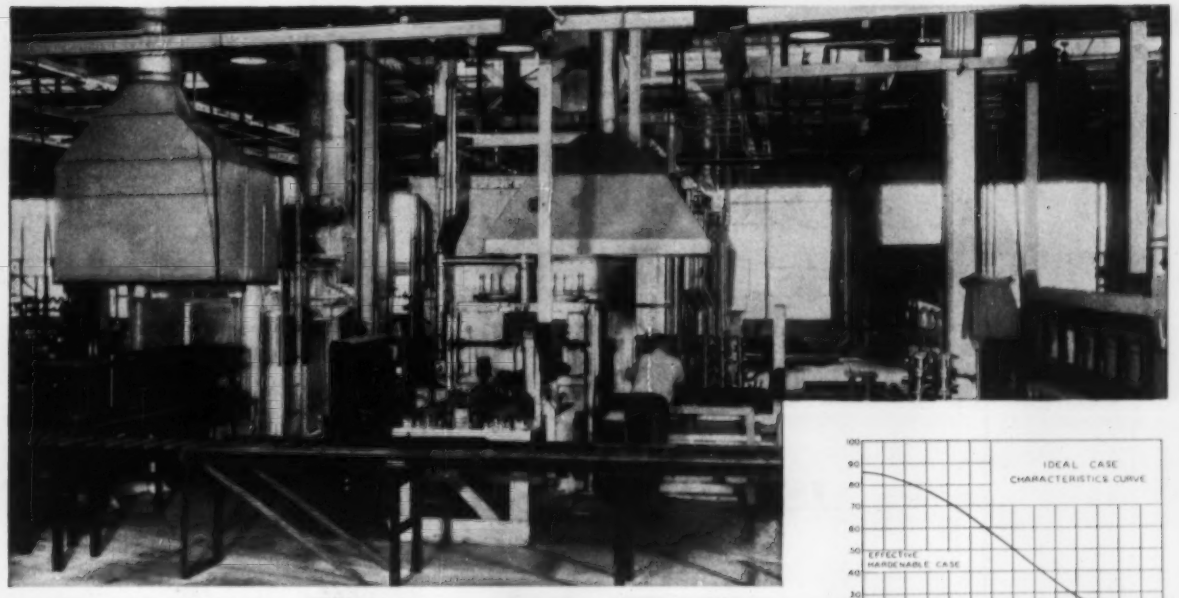
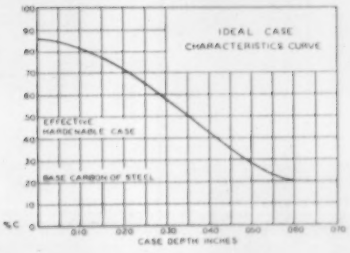
how you can benefit by JESSOP'S great product variety

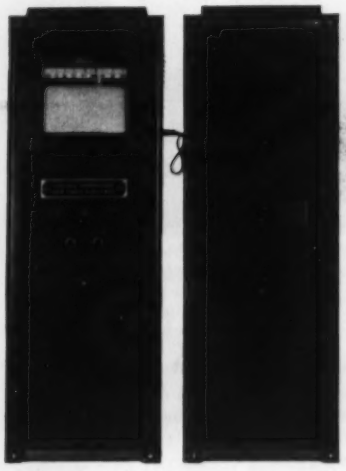
Hopes for the future notwithstanding, Jessop lays no claim to being the largest specialty steel maker in America, but careful check shows it to be the most diversified. We produce the greatest variety of special steel products, shapes and sizes available anywhere. There's a profit story in this for Jessop and for you, too. *We* profit by spreading ourselves across a greater segment of industry. Like a modern investment trust we avoid the ups and downs of vertical markets. Our current sales success proves the point. *You* can profit if you come to Jessop for more of your requirements and obtain the service and delivery advantages that single-source purchasing affords. What's more, you'll enjoy doing business with the Jessop team . . . aggressive men eager to earn their salt by helping you in your business. Check the list on this page and pick more products to buy from Jessop. You'll be glad you did.





on the nose every time

WITH SURFACE AUTOCARB AUTOMATIC CARBON POTENTIAL CONTROL



New high physicals in carburized gears — better tooth-to-tooth and gear-to-gear uniformity—faster cycles—automatic compensation for changes in work surface area during furnace operation . . .

These are the chief benefits Warner Gear Division, Muncie, Ind., achieves in its most recent continuous gas carburizing line, using the 'Surface' fully automatic carbon potential control system. In a nutshell: The Surface dewpoint recorder-controller periodically checks carbon potential in each of three zones in the furnace (with a range of .3 to 1.1% carbon), controls mixing valves to deliver correct additions of air or gas to maintain desired carbon potential in each zone. This system eliminates the human element in controlling carbon potential. It also provides Warner Gear with the necessary close control required for the practical carburizing of gears with near-eutectoid surface carbon concentrations.

Write for Literature H-54-2.

Surface
HEAT TREATING EQUIPMENT

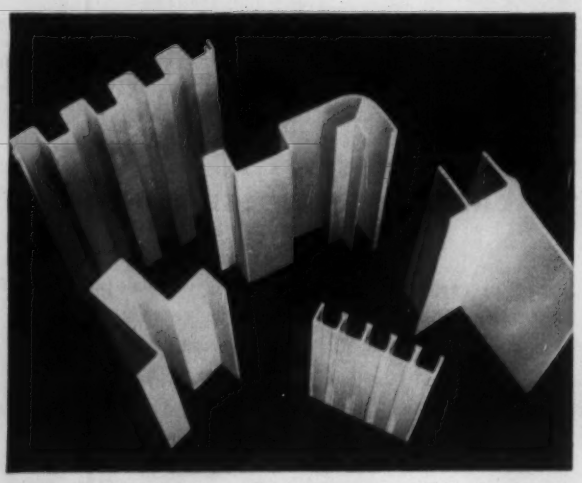
SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

ALSO MAKERS OF

Kathabar HUMIDITY CONDITIONING *Janitrol* AUTOMATIC SPACE HEATING

Service to manufacturers

is our business



EXTRUDED SHAPES All standard alloys are available in custom shapes (solid, semi-hollow and hollow), structural, rod and bar, and in extruded tube.

SHEET AND PLATE Supplied as flat sheet, plate, coil sheet, circles in a complete range of alloys, sizes and tempers. Specialty sheets available on inquiry.

As a basic producer of aluminum, we are in the business of supplying manufacturers of end products.

Therefore, our efforts are put behind the job of serving these manufacturers—and helping them in the solution of *their* problems.

In recent years, our services have been expanded in order to keep pace with our greatly increased production capacity—which today is close to 30% of all the primary aluminum made in this country.

To give you fast personal service, we have expanded our sales offices to key cities throughout the country.

We have expanded our distributor program so that we now have a warehouse distributor in almost every major city.

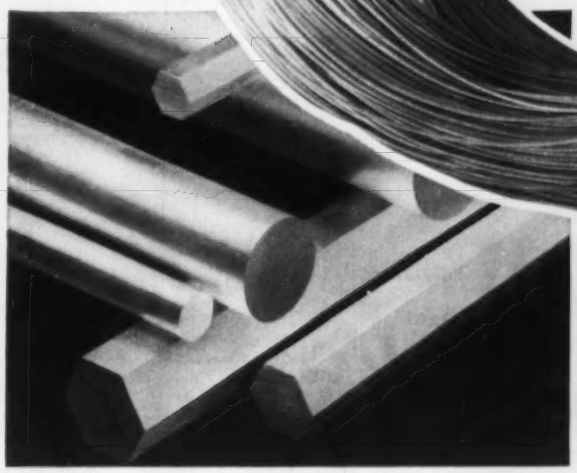
We have increased our sales force and our staff of field engineers, employing specialists in many fields, such as roll-forming, extrusions, conductor, etc.

However, important as these additions are, we believe the most significant thing about Kaiser Aluminum's service is the attitude behind it. An attitude that moves men to work harder, longer, and with greater determination.

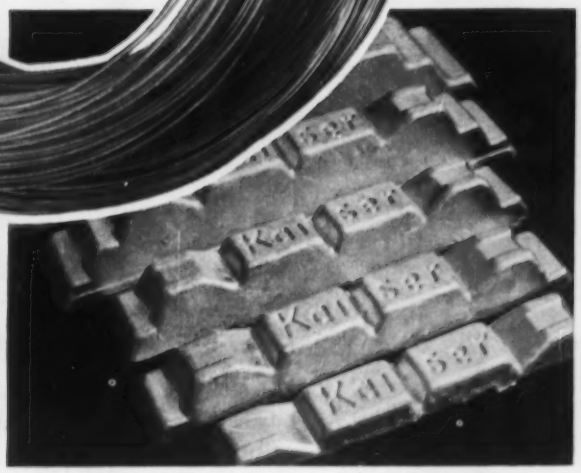
We believe that the kind of service we offer—combined with the unsurpassed quality of Kaiser Aluminum—should be of particular interest to all aluminum fabricators.

Setting the pace... in growth, quality and service **Kaiser**

WIRE Supplied as round or hexagonal drawn wire. Also rivet, welding, screening, EC and redraw.



ROD AND BAR Available in a wide range of alloys in rolled and cold finished rod and bar, round and hexagonal standard screw machine stock, hexagonal bar, redraw rod, rivet rod and round forging stock, square and rectangular bar.



PIG, INGOT AND BILLETS Kaiser Aluminum produces Pig, Ingot and Extrusion Billets in a range of alloys and sizes to meet your specific requirements.

For complete information, call or write any Kaiser Aluminum sales office or one of our many distributors, located in principal cities. See our catalog in Sweet's Product Design File or write for copy. Kaiser Aluminum & Chemical Sales, Inc., General Sales Office, Palmolive Bldg., Chicago 11, Illinois. Executive Office, Kaiser Bldg., Oakland 12, California.

Other Kaiser Aluminum products include: industrial foil, and electrical conductor. Kaiser Aluminum also supplies household, freezer and broiler foil for home uses; Shade Screening for the building industry and roofing and siding sheet for farm and industrial buildings.

Aluminum

Send for the new
PRODUCT DESIGN CATALOG,

containing 24 pages of valuable information on all Kaiser Aluminum Products.

KAISER ALUMINUM & CHEMICAL SALES, INC.
Industrial Service Division
5541 Kaiser Bldg., Oakland 12, California

Please send my free copy of the Product Design Catalog.

Name_____

Firm_____

Address_____

City_____ State_____

It's an open secret...

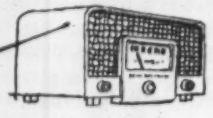
"You can depend on friendly help from Lamson & Sessions"

Lots of people know, and you should too, that Lamson specializes in helping companies solve their Fastener dilemmas. It's all part of the valuable extra service that is automatically yours when you call in the Lamson man.

What's more, your Lamson & Sessions distributor can also arrange factory engineering and advisory service. Just ask him and he'll pass the request on to one of Lamson's five plants.

So if a "how to fasten it" problem has you stumped, and you need quick cooperation, don't hesitate to call on us for help. Possibly you'll find the answer is already in our files.

This is another plus service that leads our customers to say: "It's a pleasure to do business with Lamson & Sessions".



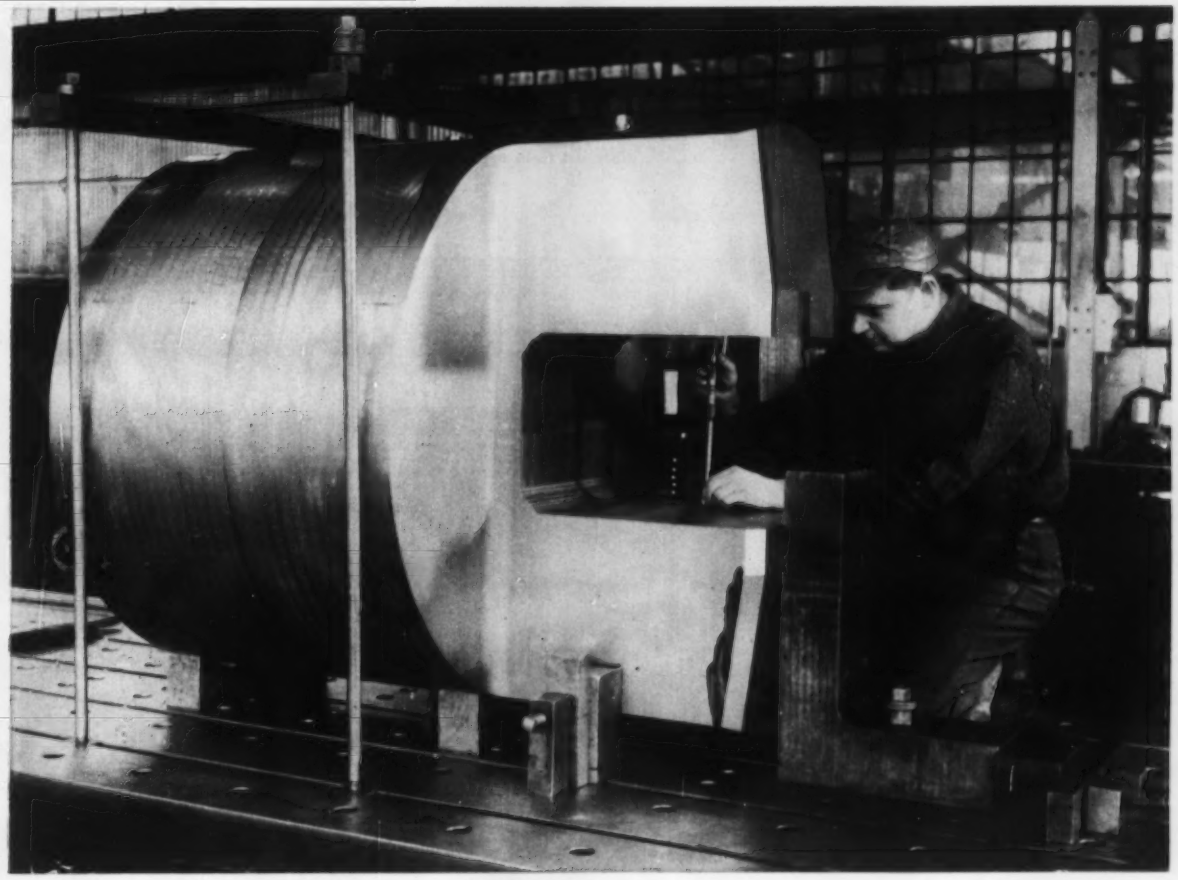
YOU GET MORE WHEN YOU BUY FROM . . .

Lamson & Sessions

The LAMSON & SESSIONS Co.

1971 West 85TH St. • Cleveland 2, Ohio

CLEVELAND AND KENT, OHIO • BIRMINGHAM • CHICAGO



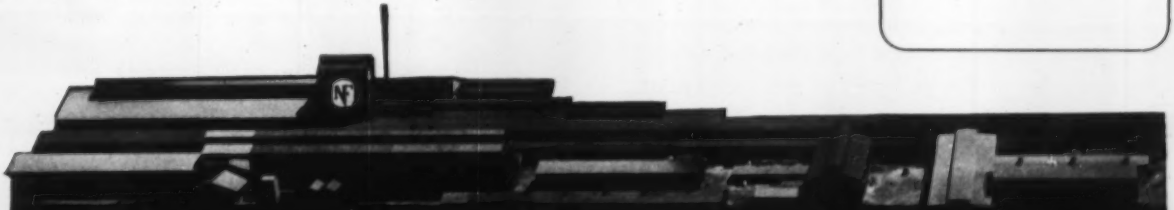
This Forging is made for really HEAVY DUTY-

Transmitting power under constant heavy vibration and sudden severe shock loads is the future in store for this giant mill coupling. It was National Forged as a double with its mating end from a single huge ingot. It is 40-50 carbon steel treated to 72,000 Min. tensile strength with 39,000 elastic limit. This forging and its adjoining coupling are 40" in diameter x 48-1/4" long and weigh 9,800 lbs. each. They are being machined to fractional inch tolerances to keep clearances at a minimum. This care in machining is extremely important to long operational life.

National Forge is equipped to turn out any steel to your exact analysis and finish machine to your exact specifications.

Whether your forging requirements are large or small, simple or intricate . . . try National Forge next time.

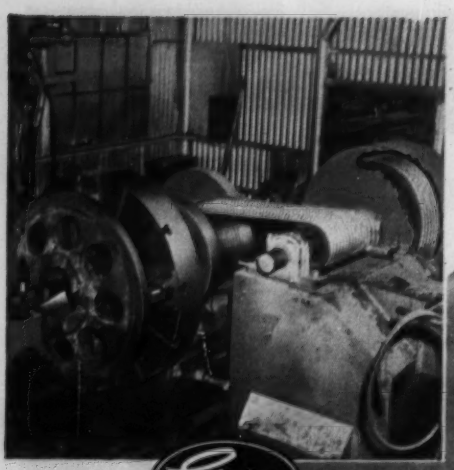
Send for your free copy of National Forge's New Bulletin explaining their Operations and Facilities.



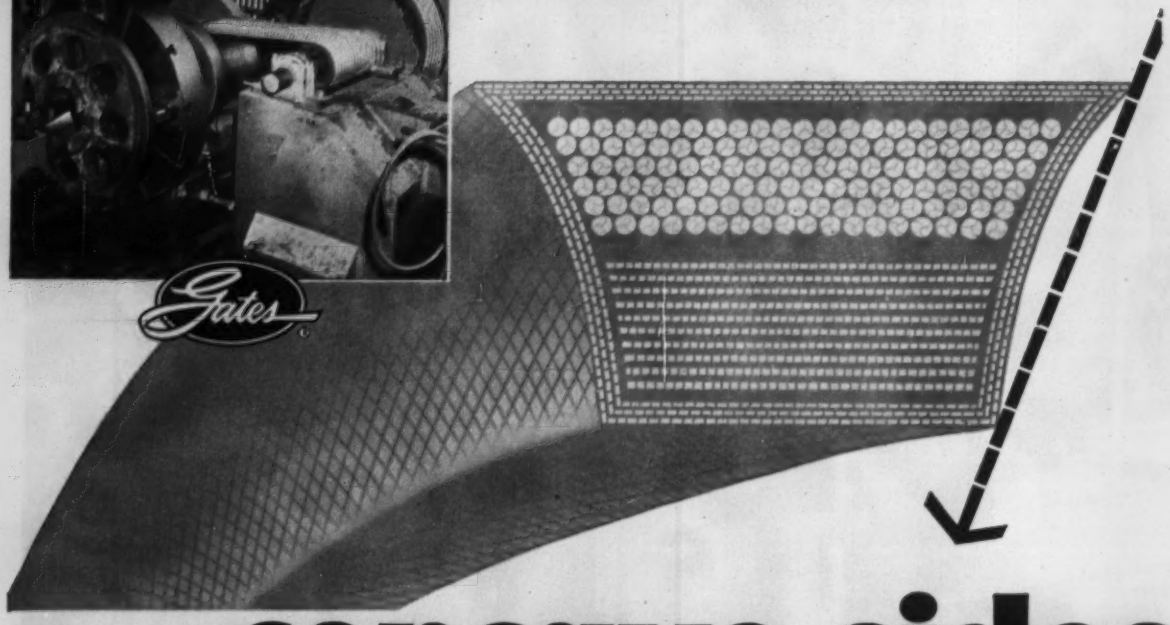
NATIONAL FORGE AND ORDNANCE COMPANY

PRODUCES BETTER STEEL FORGINGS AND MACHINE WORK

IRVINE, WARREN COUNTY, PENNSYLVANIA



The smooth, positive flow of power transmitted through Gates Vulco Ropes enables this large engine lathe to handle quickly and efficiently many tough oil field repair jobs.



How concave sides cut V-belt costs!

Plants all over the world have made this discovery: Gates Vulco Ropes—the V-belts with *concave sides*—wear longer; cost less per year of service.

Here is the interesting reason why:

When the Gates Vulco Rope is bent around the sheave, the *precisely engineered* concave sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes full, uniform contact with the sides of the pulley. You get sure pulling power and *even distribution of wear.*

Longer wear saves not only on replacement costs; it also saves the cost of down-time... keeps equipment producing.

It's easy to prove to yourself the value of concave sides

Simply bend a straight-sided belt (Fig. 2) and *feel* the bulge at the sides around the bend. You will quickly see why the bulging sides prevent an even fit in the pulley groove (Fig. 2-A). Uneven contact shortens belt life...increases belt costs.

Cut belt replacement time and costs...specify Gates Vulco Ropes—the V-Belt with *concave sides* (U.S. Pat. 1813698). The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts.*

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA-30-A-C

GATES VULCO ROPE DRIVES

Special Qualities

for all sheet metal work...

WEIRTON GALVANIZED STEEL

Whether it's complicated work for a special purpose or an everyday duct job, there's a Weirton galvanized steel to help you do it quicker—and better. Weirton's close control of quality through every step of the production process is carefully planned—and faithfully executed—to assure a tight coat that forms readily, looks better, and resists both peeling and flaking.

So when the job calls for galvanized steel, call Weirton and be sure. Let their experience serve you and your customers—to your profit.

WEIRTON STEEL COMPANY
Weirton, West Virginia
a division of
NATIONAL STEEL CORPORATION

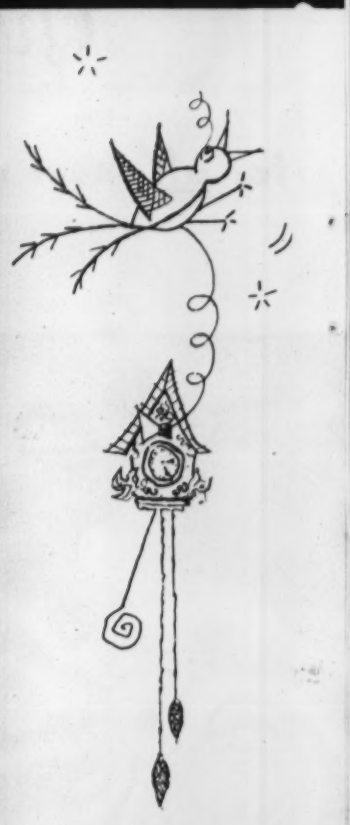
YOUR TURNING-TIME CONCEPTS

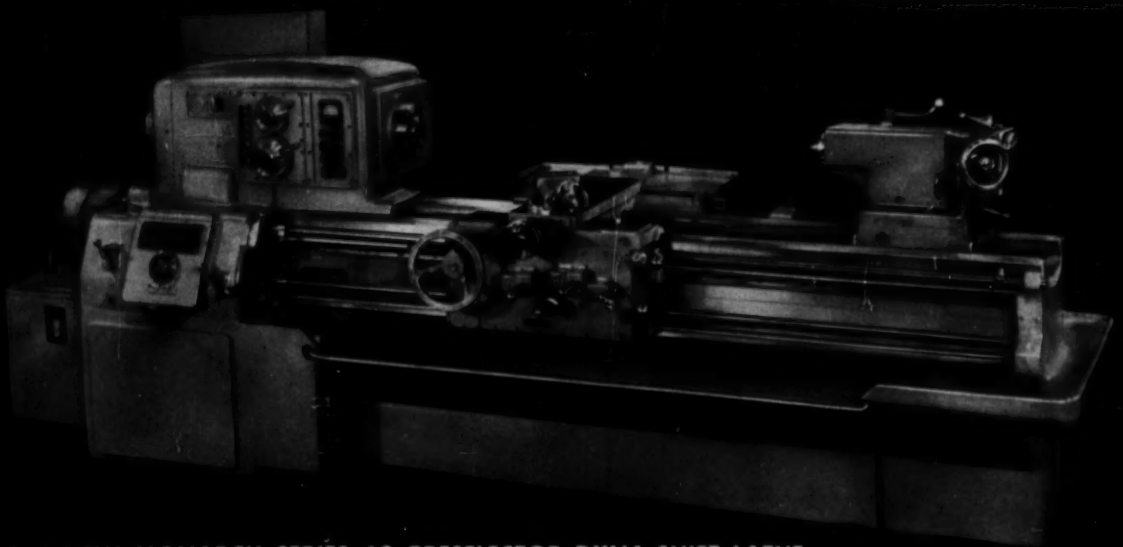
Set it—forget it! That's the story of the Preselector Dyna-Shift. It's the brain Monarch has built into the new Series 62. With it *this* machine will give a greater ratio of metal removing hours to work hours than you ever dreamed possible.

When setting up, merely dial the surface speed wanted and the first diameter to be turned—the Dyna-Shift computes the R.P.M. and makes the shift instantaneously and automatically. *(Time-saver #1).* Then, to maintain this surface speed on successive diameters, set the work diameter selectors. Every speed change thereafter, on *every* piece in the run, takes place automatically with but one fast dial setting and movement of the work start and stop lever. *(Time-saver #2).* What's more, here at last is the lathe with a speed range so wide as to take care of all your needs. Its 20 H.P. drive gives you 36 different spindle speeds in a range from 14 to 1750 R.P.M., a ratio of 1 to 125. *(Time-saver #3).*

Nor are the time-saving features of the Series 62 limited to the Preselector Dyna-Shift headstock. There's four-way power rapid traverse which cuts tool positioning time on the average of 50%. There's the totally enclosed and automatically lubricated gear box and end gearing. There's a completely new two speed tailstock. Add them all up and you get a new lathe concept that means Production with a capital P!

You will want to know all about these and many other features in detail. Send the coupon for the greatest turning news in years!! . . **The Monarch Machine Tool Company, Sidney, Ohio.**



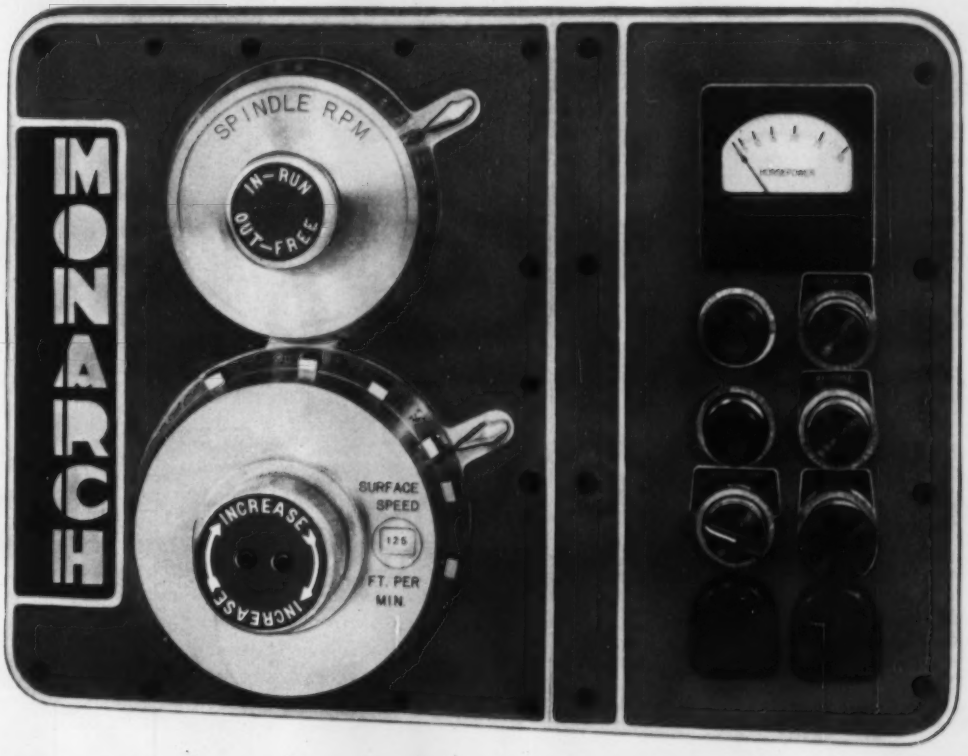


THE NEW MONARCH SERIES 62 PRESELECTOR DYNA-SHIFT LATHE

Models 130 and 1130 (above)—13" swing over cross slide, 20" clearance diameter.
Models 131 and 1131—16" swing over cross slide, 24" clearance diameter.

ARE IN FOR A SHOCK!

See the New Monarch Series 62 Preselector Dyna-Shift — — Unequaled for Speed and Ease



Monarch
TURNING MACHINES
ACCURACY • ECONOMY • LONG LIFE

FOR A GOOD TURN FASTER ... TURN TO MONARCH

THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio

Gentlemen:

☐ I am interested in your Series 62 story. Please send me your illustrated Booklet #1501 with complete data.

☐ Please have a Monarch sales engineer call on me.

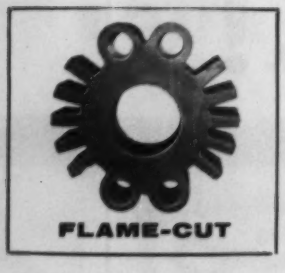
NAME _____ TITLE _____

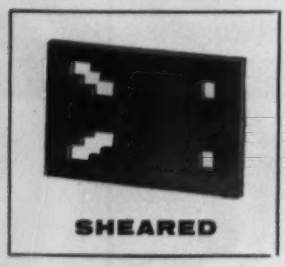
COMPANY _____

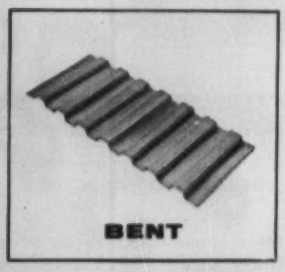
ADDRESS _____

CITY _____ ZONE _____ STATE _____

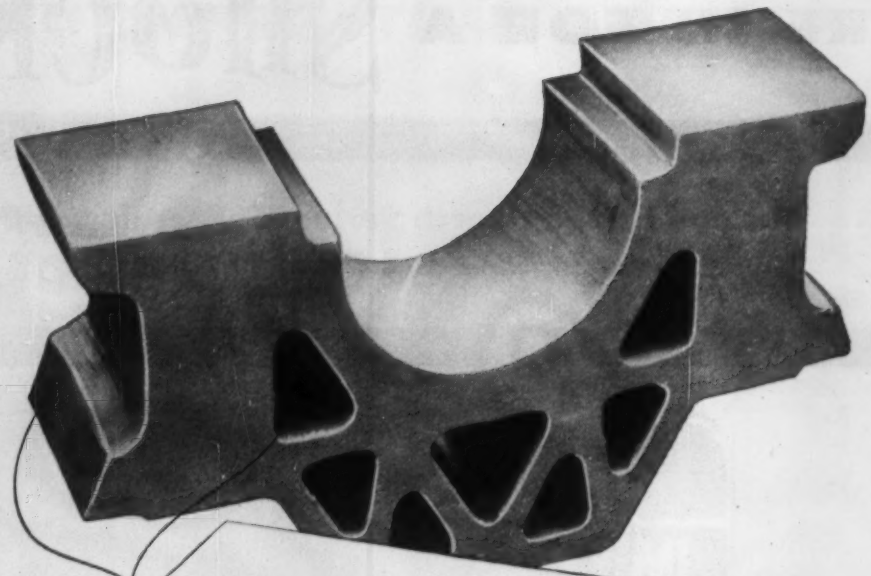
FILL OUT COUPON—and attach to your business letterhead, please







LUKENS



Are You Paying a Premium to Make Your Own Parts?

STEEL PLATE SHAPES SERVICE CAN HELP YOU SAVE 5% TO 25% ON COMPONENTS

You can cut production costs—save from 5% to 25% on components—by using By-Products Steel Co.'s Steel Plate Shapes Service to pre-form your parts.

With this Service you can reduce fit-up and finishing costs, eliminate one or more production steps, cut scrap losses and extra freight and handling charges. Operations are speeded by freeing men and machines for other work, and costly plate inventories are reduced.

By-Products has over 150 major machines and a large stock of standard dies of all types available. Work can be done to close tolerances directly from blueprints and may be ordered as formed, or rough- or finish-machined. Shapes of rolled steel plate give you strength, dependability and weight reduction, offer greater possibilities for design freedom.

By-Products can work from plates up to 195" wide or 25" thick in whatever qualities your product requires. Direct access to facilities of the world's leading specialty plate producer speeds production, permits great flexibility in forming and heat treating. To find out more about this unique Service, write on your company letterhead for Bulletin 712. Address: By-Products Steel Company, 742 Strode Avenue, Coatesville, Pennsylvania.

STEEL PLATE SHAPES SERVICE

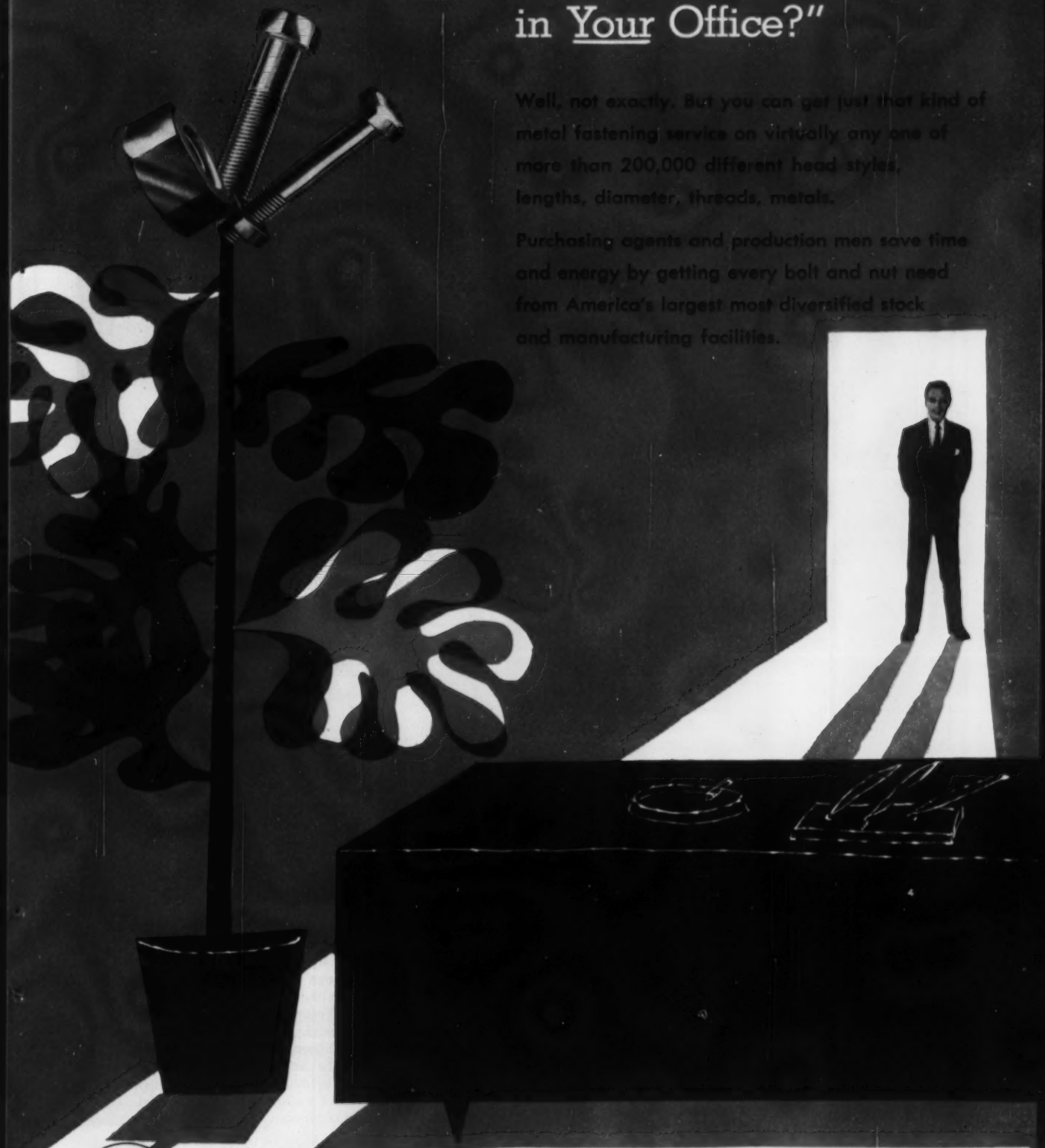
BY-PRODUCTS STEEL CO.

A Division of Lukens Steel Company, Coatesville, Pennsylvania

"What? A Nut and Bolt Plant in Your Office?"

Well, not exactly. But you can get just that kind of metal fastening service on virtually any one of more than 200,000 different head styles, lengths, diameter, threads, metals.

Purchasing agents and production men save time and energy by getting every bolt and nut need from America's largest most diversified stock and manufacturing facilities.



Everything For Fastening

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GENERAL OFFICES: 363 WEST ERIE STREET, CHICAGO 10, ILLINOIS

MANUFACTURING PLANTS IN CHICAGO • ST. LOUIS MILWAUKEE

STERLING BOLT PRODUCTS AVAILABLE AT THESE AND OTHER DISTRIBUTORS

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PENN BOLT & NUT CO.
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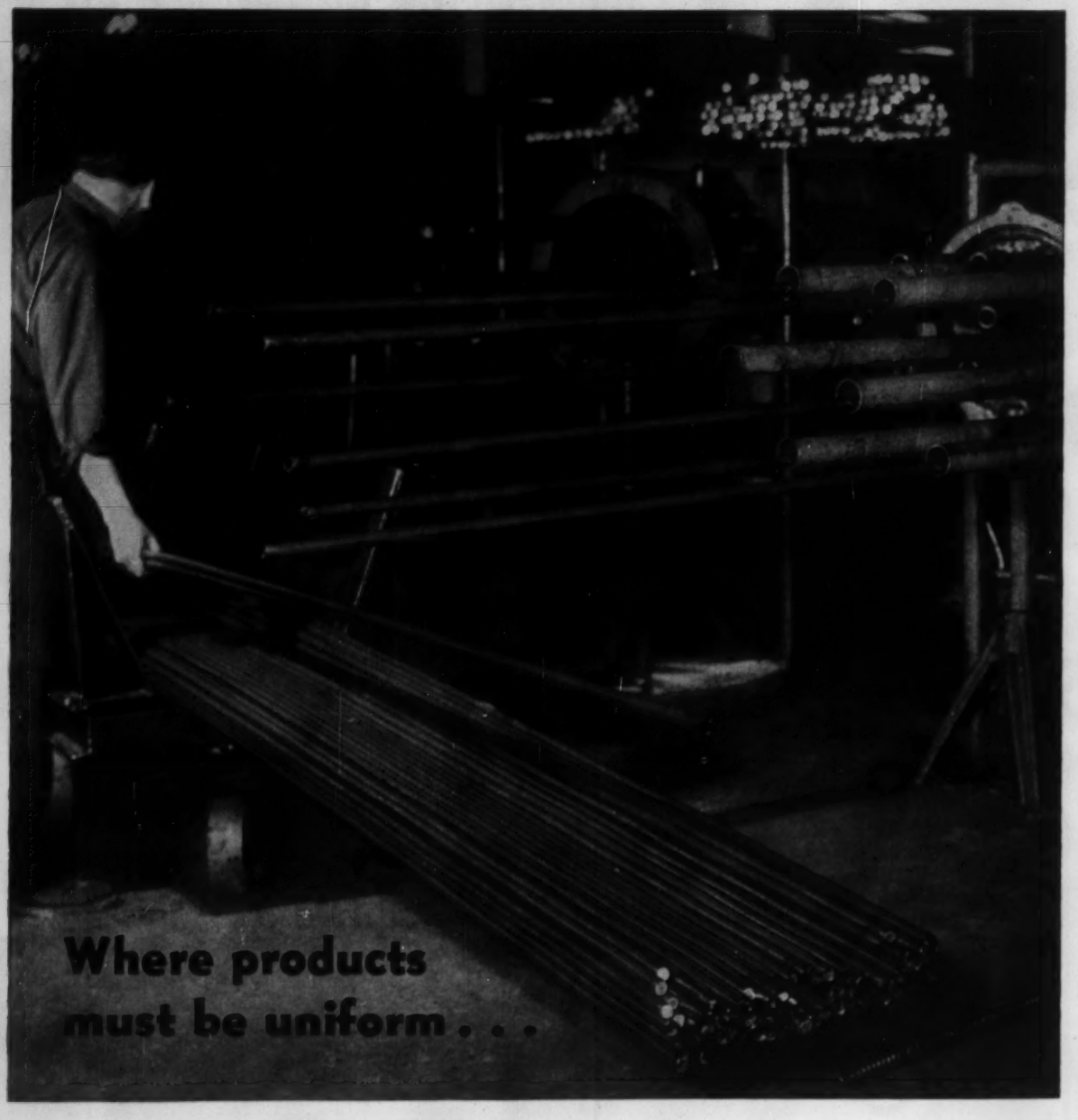
Sexton Road off Graham St.
McKees Rocks, Pa.
FEDERAL 1-1081

EAST COAST BOLT & NUT CO.
84-94 Hudson St.
New York 13, New York
WORTH 6-3440



SPECIFY

Youngstown

COLD FINISHED CARBON AND QUALITY YOUNGSTOWN SERVICE ALLOY STEEL BARS

●It takes steel bars of uniform quality to turn out uniform products. That's why so many shops prefer Youngstown Cold Finished Carbon, Yolead and Alloy Steel Bars.

With Youngstown, uniformity starts in the Bessemer or Open Hearth. It is maintained throughout manufacture by men trained to work to exact specifications, checked at every step by close inspection. The name Youngstown is your best assurance of uniformity in screw machine stock.

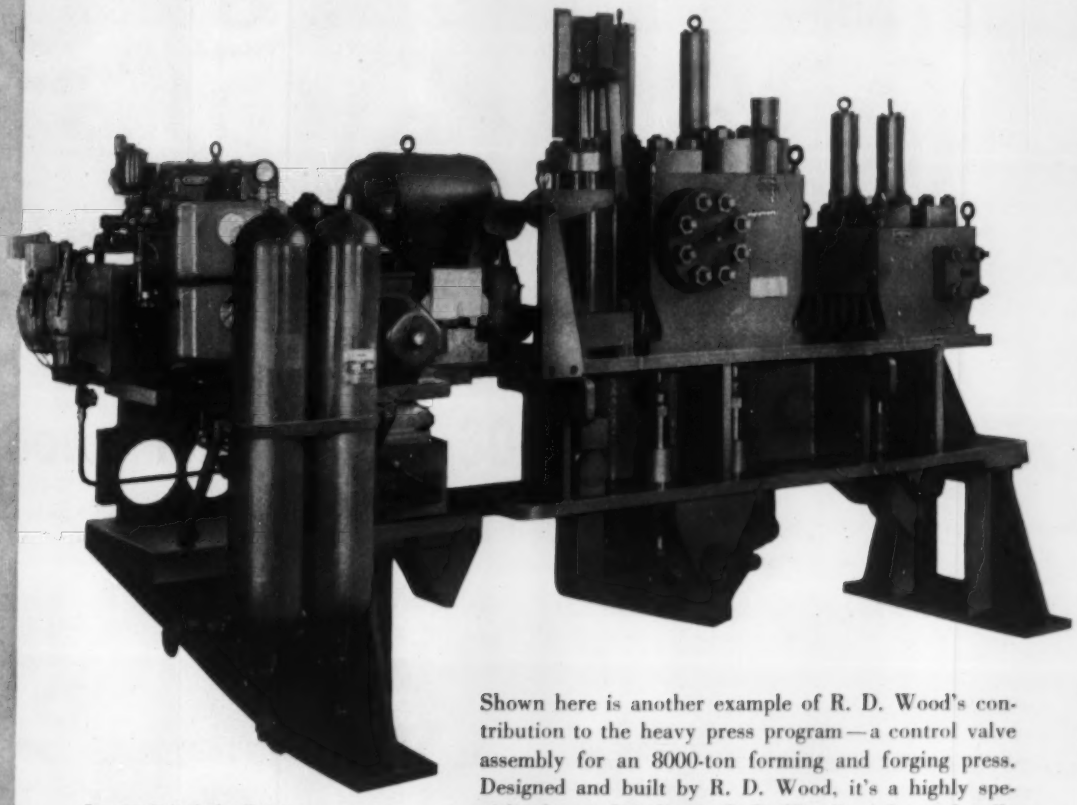
THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

Big help in heavy press program

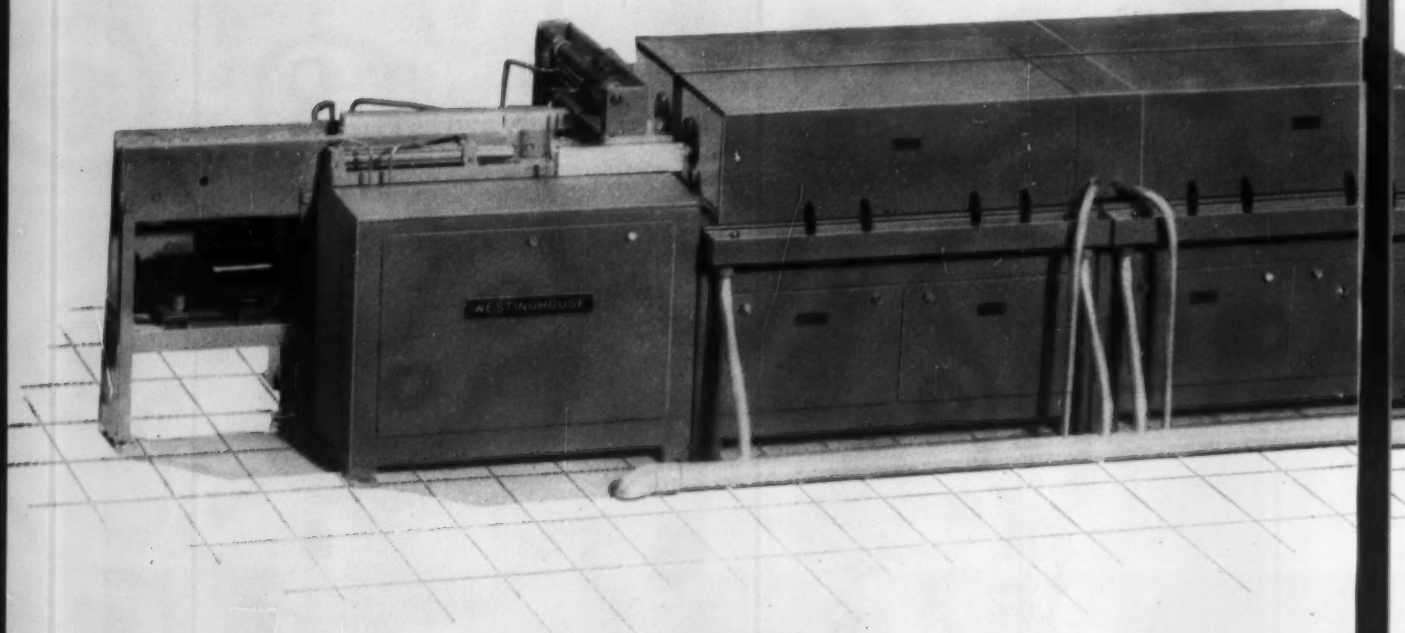


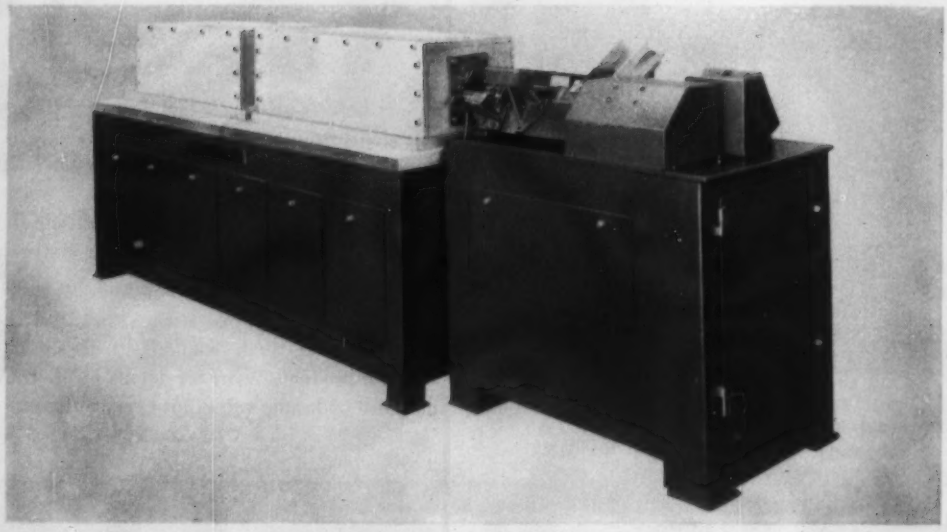
Remote electro-hydraulic servo control valve assembly. Length is 14 feet; height 9 feet.

Shown here is another example of R. D. Wood's contribution to the heavy press program—a control valve assembly for an 8000-ton forming and forging press. Designed and built by R. D. Wood, it's a highly specialized type. It indicates R. D. Wood's ability to handle the most difficult valve engineering and manufacture.

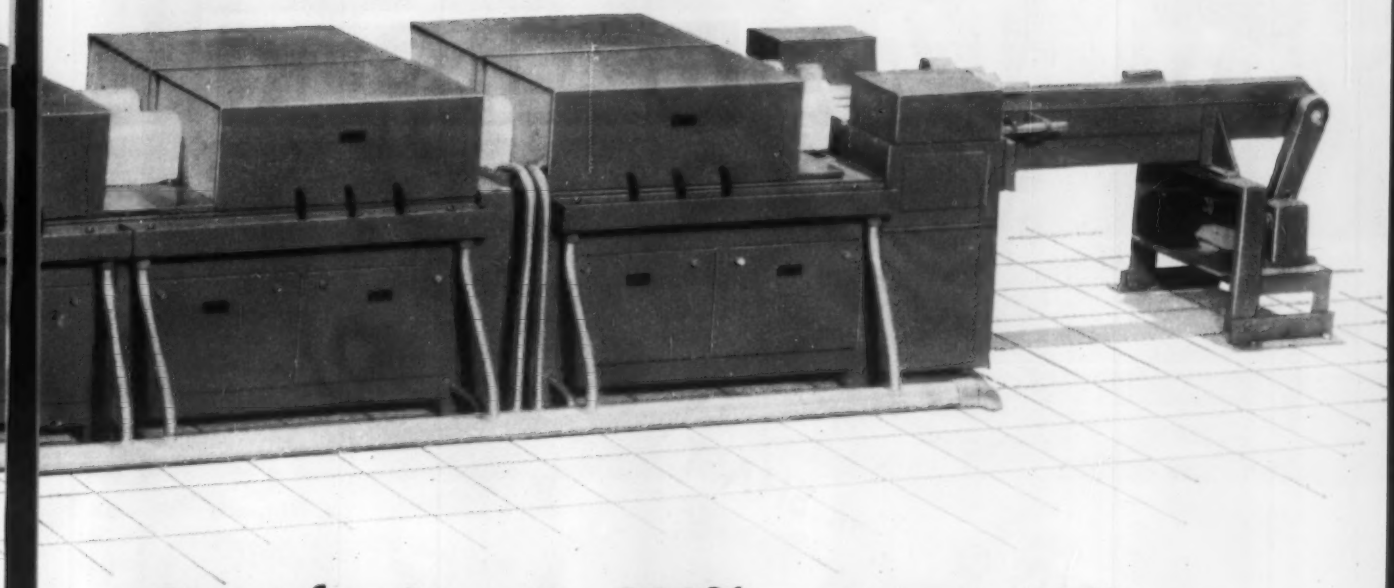
Other standard R. D. Wood high-pressure hydraulic valves include stop, operating, check, relief, and safety types. Since 1803, the name R. D. Wood has stood for superior products. Write for details on R. D. Wood high pressure hydraulic valves for every purpose.

Dual-frequency heating at its best . . . the equipment shown here (using 60 and 960-cycle power) heats 3½" R.C.S. steel billets, 8" long, to 2150° forging temperature at a rate of 480 an hour. An actual installation, using six of these machines, heats 40 tons an hour!





Another outstanding example of Westinghouse dual-frequency induction heating for forging. Clean, cool, and safe, this billet heater takes only 4' x 8' of production floor area. Using dual-frequency power (60 and 960 cycles) it heats 2½" diameter, 3¾" steel billets to 2250° forging temperature at a rate of 360 per hour.



Boost forging rate 300%, cut costs 60%...

with Westinghouse induction heating

Based on a recent forging analysis, these figures tell dramatically what savings are being accomplished by Westinghouse induction heating compared to today's "old-fashioned" methods.

How? Here are seven big savings:

- Scale loss reduced to 6/10 of a percent—60 to 80% savings.
- Longer die-life because of low scale.
- Maintenance costs cut 80%.
- Scrap loss practically eliminated.
- Flexible to all production needs—short start-up time; stand-by losses are low or nonexistent. Accurate repetitive control of temperature.
- Shearing costs eliminated.
- Pushbutton operation—completely automatic—makes it practical to put forging right in the production line.

Westinghouse ingenuity is the key. Successful installations—some with even better savings—prove that two factors are vital to full benefit of induction heating . . . good equipment and expert application.

Westinghouse offers you a complete, one source service to analyze induction heating for *your* plant. Survey, recommendation, engineering and manufacturing—all by experienced Westinghouse personnel—assure you the proper frequency, power and method of handling to most effectively reduce costs in your plant.

Right now is the time to investigate. You can lead the way to lower break-even points, decreased unit costs—point to extra profit possibilities—by bringing Westinghouse into your forging picture. Call your representative or write: Westinghouse Electric Corporation, H. F. Heating Section, 2519 Wilkens Ave., Baltimore 3, Maryland.

J-02292-B

INDUCTION HEATING FOR
HARDENING • JOINING • ANNEALING
FORGING • HEAT-TREATING

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FLOATING GEARMOTOR

eliminates: Base Plates, Couplings Line Shaft and External Gearing

The Philadelphia "Floating" GearMotoR is a new concept for powering steel mill roll tables, conveyors, textile machines and many other industrial drives. This motorized worm gear reducer mounts directly on the driven shaft, and requires no mounting provisions other than a simple torque arm . . . the GearMotoR is supported by the same bearings as the drive shaft, thus the power unit is reduced to its simplest form.

Because the Unit actually "floats" with the driven shaft, there is no problem in providing for and maintaining alignment . . . the power unit and the driven shaft become a simple integral unit.

The "Floating" GearMotoR can be mounted in almost any location, and the use of right angle worm gearing permits the GearMotoR to nestle close to the driven machine, thus saving valuable floor and aisle space. Also, special design and sealing features make it possible to mount it in any desired position — motor horizontal, vertical up or down.

The "Floating" GearMotoR is manufactured in both single and double gear reductions offering a wide range of out-put speeds from 9 to 420 rpm. Motors are available in almost any required combination of electrical characteristics ranging in size from 1 to 15 horsepower.

Proof of the outstanding performance and reliability of the "Floating" GearMotoR lies in the many successful installations throughout the United States and Canada.

Send for Catalog F-54, and be convinced.

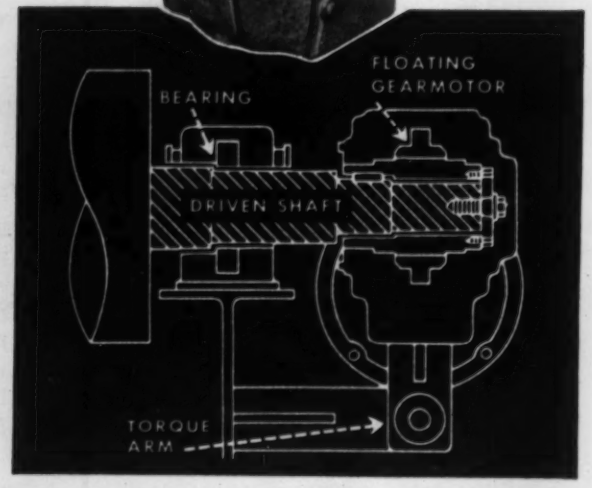


Illustration shows simplicity of assembly and mounting of the "Floating" GearMotoR in the motor-horizontal position. GearMotoR and driven shaft are supported on same set of bearings.
Note compactness of the installation.

PHILADELPHIA GEAR WORKS, INC.

ERIE AVE. & G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA
Virginia Gear & Machine Corp. • Lynchburg, Va.

Industrial Gears & Speed Reducers

LomTorque Valve Controls

Established 1892

See why Tool Engineers call these heavy producers,

"MOST MODERN MACHINES OF THEIR TYPE"

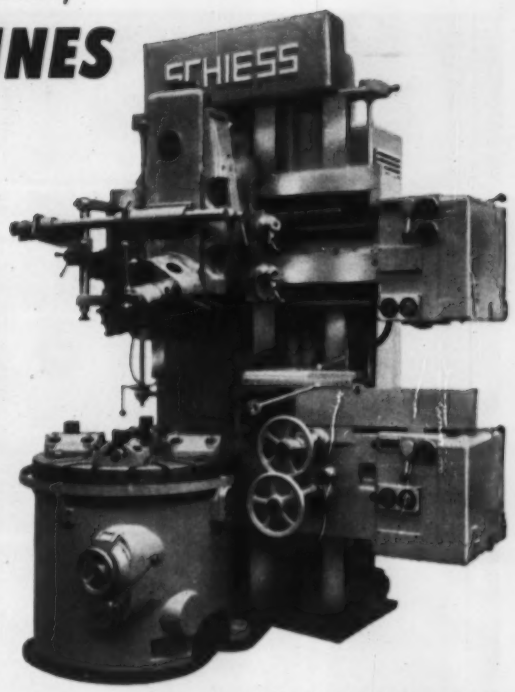
Hydraulic pre-selection of speeds set by handwheel and read on illuminated dial. 16 spindle speeds—ratio 1:50—up to 310 rpm for carbide machining on Model KE 100. Table runs on tapered roller bearings.

Fingertip control for direction of feed and rapid traverse with spring-loaded mono-levers for normal direction plus angular compound feeds. Mono-levers move in same direction as desired feed or traverse movement, simplify correct setting by operator. Specially designed electro-magnetic disc clutches disengage feed instantly with no over-riding or coasting.

Counterbalanced cross rail and side head. Single lever unlocks, raises or lowers, and locks cross rail simultaneously by electro-mechanical controls. *No bolts or nuts to loosen or tighten by hand.*

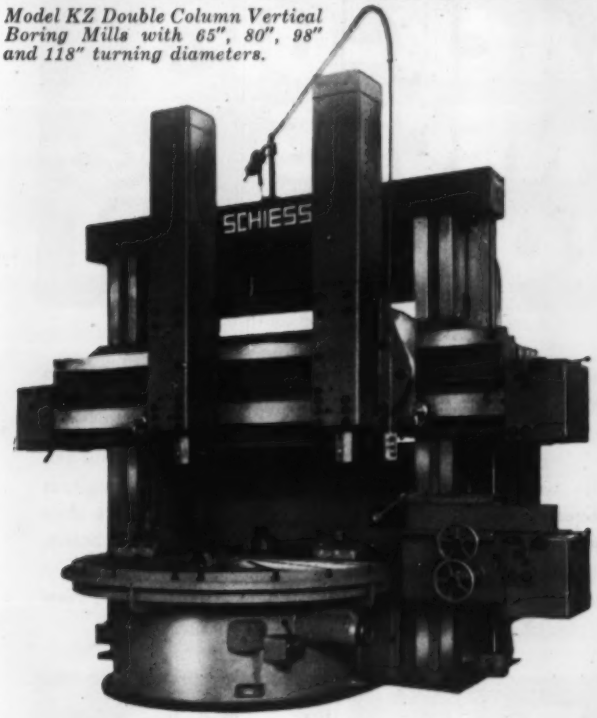
All-vertical gear drive with main motor mounted on back of machine, directly connected to gear box. Changes in direction of drive transmitted to table without bevel gears, eliminating vibration and backlash.

Copying attachment with electric tracer for use either on cross rail or side head.



Model KE Single Column Vertical Turret Lathes with 40", 50" and 65" turning diameters for high-speed carbide machining.

Model KZ Double Column Vertical Boring Mills with 65", 80", 98" and 118" turning diameters.



All operating features of KE Series Vertical Turret Lathes are combined in

SCHIESS KZ DOUBLE COLUMN VERTICAL BORING MILLS, PLUS—

Heads equipped with steel octagon rams can be swiveled—have automatic feed in vertical, horizontal and angular direction and are independent of one another as to amounts and direction of feed. Table operated by three-button pendant control. Standard model KZ Double Column Vertical Boring Mills are available with 65", 80", 98" and 118" turning diameters.

Get to know these products of Europe's largest builder of heavy machine tools. Parts and service are as close as Pittsburgh. An American Schiess engineer will be happy to help you size up these heavy producers for your heavy production needs. Write for catalogs and complete specifications on these and all Schiess KE machines.

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Texaco Regal Oil is a high quality, heavy duty oil that affords *extra protection* because of its high resistance to oxidation, emulsification and sludging, and its ability to separate rapidly from water. This keeps lines clear and bearings clean for trouble-free performance and minimum wear.

For your enclosed reduction gears, use *Texaco Meropa Lubricant*—noted for its EP stability, its resistance to oxidation, thickening and foaming.

Let a Texaco Lubrication Engineer help you improve performance and reduce costs throughout your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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TUNE IN . . . TEXACO STAR THEATER starring DONALD O'CONNOR or JIMMY DURANTE on television . . . Saturday nights, NBC.

STEEL
May 16, 1955

Metalworking Outlook

Question and Answer

Question: If there is no auto strike, what will the United Auto Workers do with the $25-million strike fund being built up through extra dues assessments? Answer: It will be used in an intensive organizational drive aimed primarily at smaller automotive supply firms not now unionized. Betting is still against a work stoppage, although the UAW last week reported "no progress" on the guaranteed wage issue and ordered strike votes at Ford Motor Co. and General Motors Corp. locals. That's a routine move. The two auto companies are adamant against paying the cost of the GAW as figured by the union. The UAW is asking them to put up $480 million over a five-year period to finance, in part, the wage plan.

Steelworkers Get Set

The United Steelworkers drafted 1955 pay demands last week that they'll present to steel companies late this month. Specifics are hush-hush, as usual, but the increase they want is certain to be sizeable. Negotiations with basic steel firms employing more than 600,000 have a June 30 deadline. Contracts with steel and aluminum processing companies with an additional 600,000 employees expire at varying times from now until year end. GAW won't be an issue this year, but it will be in 1956. Preliminary sparring already goes on. In one of his first speeches as U.S. Steel Corp. chairman, Roger M. Blough said: "Industrial research is the only proved way to guarantee more and better jobs and higher wages."

Slow Year on Tax Laws

This will be a quiet year as far as tax legislation goes. Chairman Jere Cooper (Dem., Tenn.) of the House Ways & Means Committee will postpone indefinitely any action by Congress on the Treasury's 70 recommendations for corrections in the Internal Revenue Code of 1954. Mr. Cooper wants to wait until the Treasury has completed its study of the code, and tackle the changes all at once, not piecemeal.

Powerful Power Potential

Look for capital expenditures of electric utilities to double in the next 15 years. Westinghouse Electric Corp.'s sales vice president, James H. Jewell, predicts an $8-billion outlay in 1970, compared with about $4 billion this year. In the next ten years he sees utilities installing capacity to produce and distribute an additional 460 billion kw-hr of electricity.

$20-Billion Electronics Sales?

The electronics industry will have sales of $15 billion by 1960 and $20 billion by 1964. So believes Don G. Mitchell, chairman and president of Sylvania Electric Products Inc. Electronics today comprises 6.3 per cent of all military expenditures. In ten years, he says, that percentage may

Technical Outlook—p. 115 Market Outlook—p. 147

climb to 10. Defense purchases of electronic equipment by the U.S. will total $2.5 billion this year and will increase to $4 billion in ten years.

Standard of Living: High or Low?

To maintain its dynamic pattern of growth, industry must accept the premise that the U.S. has a surprisingly low standard of living. That's the word of General Electric Co.'s W. V. O'Brien, vice president and general manager of the Apparatus Sales Division. He points to the shortage of 370,000 classrooms and the need for 6700 sewage plants as examples of low standards that should be raised.

Oxygen Steel Quality High

McLouth Steel Corp. finds that sheet and strip rolled directly from steel made by the oxygen converter process are comparable or better in quality than material rolled from conventionally produced steel. Forty-four-ton heats are being made in the new converter melt shop at Trenton, Mich.

Coming: Air Cargo Developments

Watch Air Force experiments that may lead to marked developments in civilian air cargo handling. The Air Force is testing an air transportable van that allows unit loading for through shipments. Air Secretary Harold E. Talbott says that more economical air transport of cargo is urgently needed in both military and civilian functions.

Straws in the Wind

The small business share in Atomic Energy Commission procurement has almost doubled since 1951 . . . The General Accounting Office wants to plug several loopholes in present government procurement regulations . . . A record 26,573 pension and profit-sharing plans were in operation at the end of 1954 . . . American Motors Corp. seeks the advice of eight leading economists on whether the guaranteed annual wage would benefit the company; seven of the eight were members of the "public advisory committee" to advise the UAW on the matter in 1953 . . . The Senate Public Works Committee last week rejected the administration's plan to issue $21 billion in bonds outside the federal debt to help finance a $30-billion system of interstate highways.

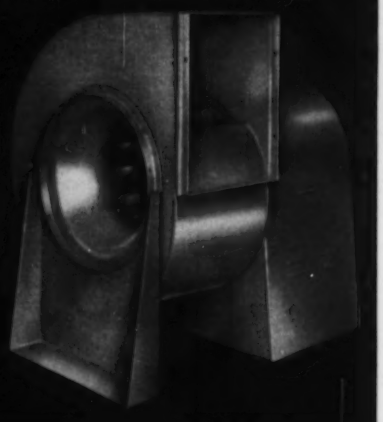
This Week in Metalworking

Expect a brighter spotlight on mergers when the Federal Trade Commission's study on antitrust laws makes its debut soon (page 63) . . . Target for 1965: A $500-billion economy (page 64) . . . Screw machine products companies see better managerial practices leading their old industry to a renaissance (page 65) . . . Hungry workers: How metalworking solves inplant feeding (p. 66) . . . New buying under at least one of four government machine tool purchase plans is coming shortly (page 67) . . . The drive to avoid manual materials handling is the basis for optimism among crane manufacturers (page 68) . . . Roundup on the heavy press program (pages 69 and 132).

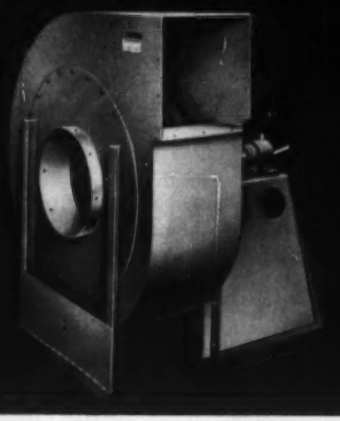
Readily Available Westinghouse Fans will help you increase production... employee efficiency!

VENTILATING SETS

Direct-Connected (6 Sizes)



V-belt driven (12 sizes)



INDUSTRIAL FANS

High-efficiency Steel casing (11 sizes)

Cast iron casing (10 sizes)

Whatever your air handling problem . . . smoke, fumes, vapor, dust, wood shavings, granular material or ventilating . . . these Westinghouse fans are designed to handle or remove them . . . efficiently and economically.

INDUSTRIAL FANS (Steel Casing) . . . high efficiency for general Air Handling; fume and dust removal; 11 sizes, each with 3 types of wheel for specific applications. Wheel diameters 19" to 64"; inlet diameters 11" to 37".

INDUSTRIAL FANS (Cast Iron Casing) . . . ruggedly built, corrosion resisting. For low volume fume or dust removal, materials conveying, industrial drying and cooling. In 10 sizes, each with 3 types of wheel for specific applications. Wheel diameters 8" to 34"; inlet diameters 4½" to 18".

VENTILATING SETS (Direct-Connected) . . . Compact, efficient, ready-to-run. Especially suited for small ventilating installations. Cleanable radial blade wheel minimizes problem of handling airborne dirt and grease. Six sizes. Wheel diameters 6" to 15"; inlet diameters 6" to 14".

VENTILATING SETS (V-belt driven) . . . Self-contained. Install indoors or outdoors in a wide variety of heating, ventilating or air conditioning applications. Twelve sizes. Wheel diameters 9" to 30"; inlet diameters 10" to 32⅞".

WESTINGHOUSE AIR HANDLING

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J-80439

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Please send facts on Industrial Fans and Ventilating Sets.

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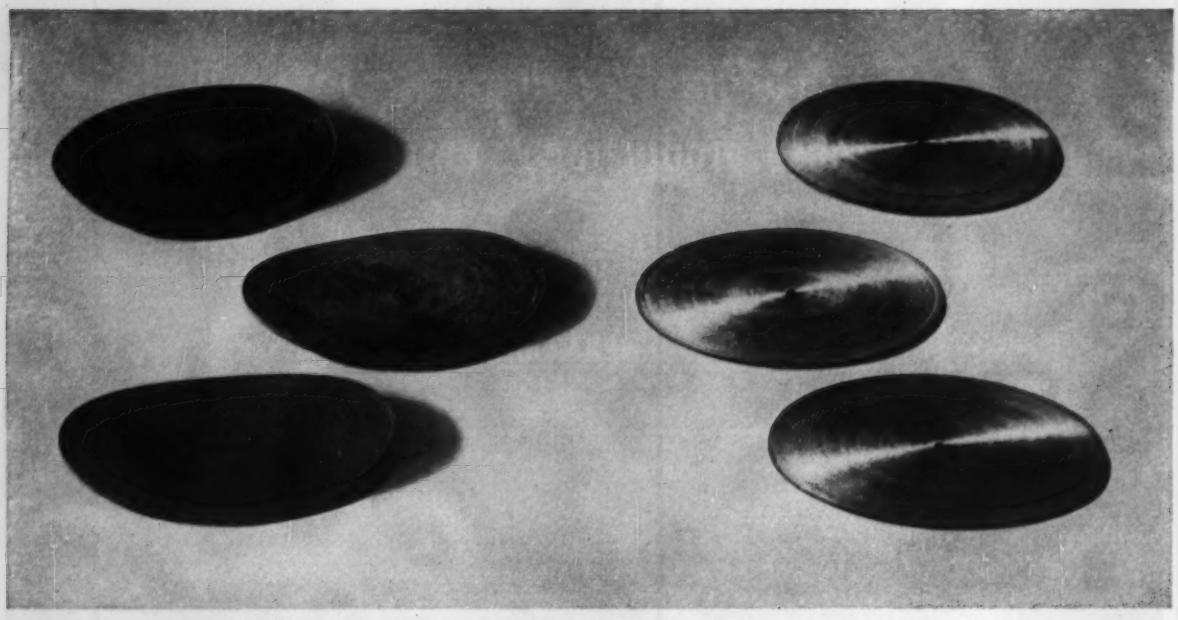

Why Armco **17-4 PH** Stainless Steel **cures distortion problems**

Here's how Armco 17-4 PH Stainless Steel and standard hardenable stainless steel reacted to heat treatment. The three samples at left are all Type 431 stainless steel; the ones at the right are Armco 17-4 PH. Both sets of discs are of the same dimensions, cut from 1¼" diameter bar stock. All have been heat treated to Rockwell C-40 to C-41.

LOW TEMPERATURE DOES IT

The Armco 17-4 PH samples have only a brown heat-tint discoloration—are perfectly flat, typical of what you may expect in your own plant. The reason is that Armco 17-4 PH is a precipitation-hardening stainless steel. The parts were fully hardened by merely holding at 900 F for 1 hour and air-cooling.

On the other hand, the Type 431 samples had to be heated to 1900 F, quenched, then stress-relieved at 600 F. They are scaled and distorted.

2 PRECIPITATION-HARDENING TYPES

If you are confronted with distortion and scaling in hardening stainless steels, Armco 17-4 PH may solve your problem. It is made in billets, bars and wire only.

For unusually high mechanical properties in sheets, strip, plates, and wire, there is a companion grade, Armco 17-7 PH. This grade takes either single or double precipitation-hardening treatment, depending on form and condition.

SEND FOR INFORMATION

For complete information on the Armco Precipitation-Hardening Stainless Steels, just fill out the coupon and mail it to us.

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Send me information on your precipitation-hardening stainless steels, Armco 17-4 PH and Armco 17-7 PH.

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Toward Better Understanding

Poor communication is the most frequent cause for failure of cost-reduction programs. The people charged with putting the program into effect do not understand its true objectives. Because they have not been fully or properly informed, they tend to become suspicious. The result is quiet, sometimes unintentional, sabotage.

That, in essence, is the comment by a member of Robert Heller & Associates Inc., Cleveland management consultants who have advised many metalworking companies on ways to reduce costs and increase efficiency.

No matter how sound a cost-reduction or other management project may be, it cannot become effective until it is understood by the people affected by it. Literally nothing happens in business until we communicate. Communication is the most important tool we have for getting things done. It is the way we influence others. It is the basis for understanding, for co-operation, for action.

The success of any executive depends more on his ability to communicate than any other skill at his command. Communication likely will take a bigger bite of his work day than any other activity. Unfortunately for him, communication is a job that cannot be delegated. He must cope with it himself. It is his own responsibility. And the higher he climbs the management ladder, the more important is accurate, effective, two-way transmission of information and meaning.

Communication is not simple. There is no easy formula. Even those most expert in the art admit their knowledge and experience is fragmentary and tantalizing. But a number of principles and guides have been developed and tested.

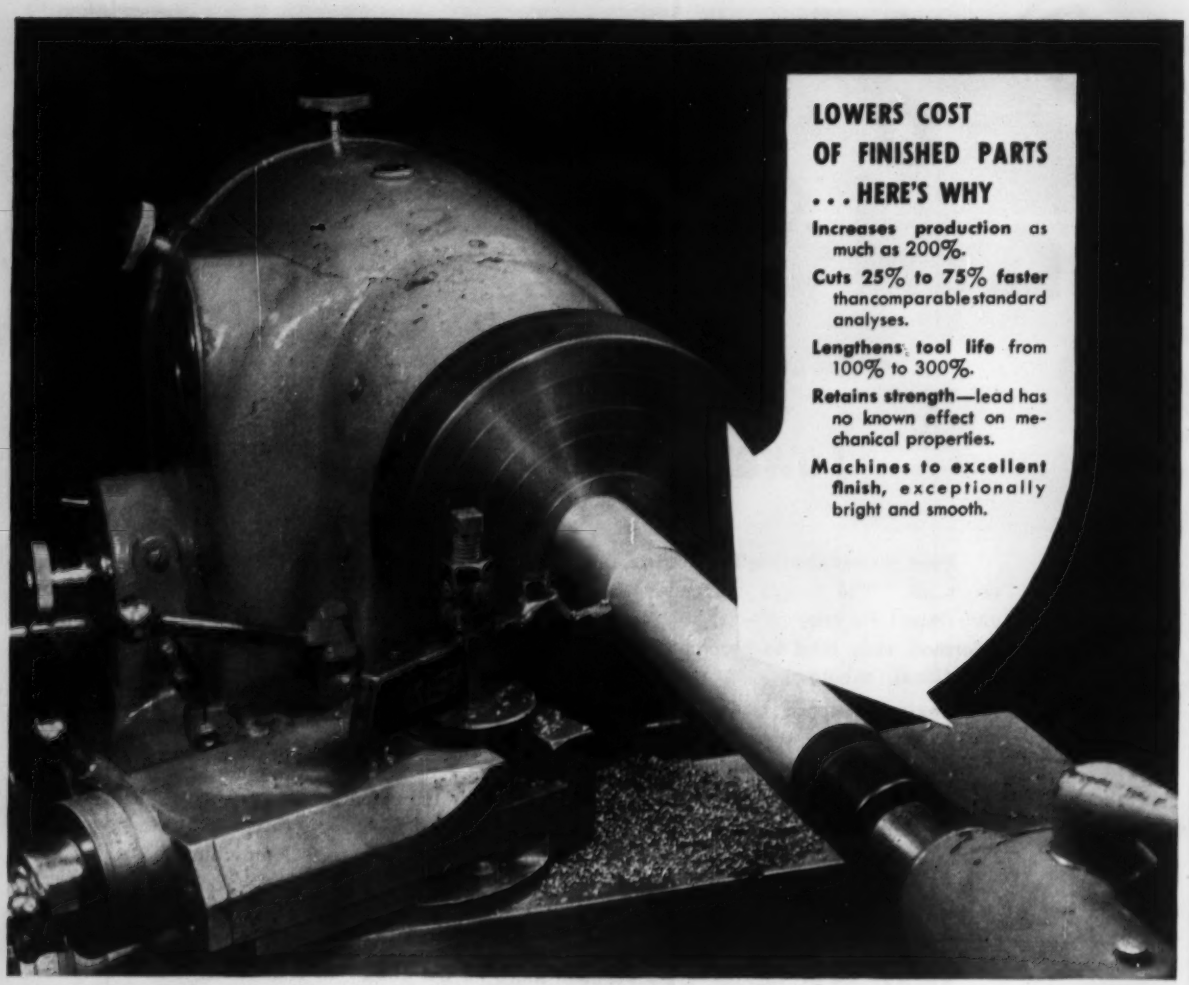
Some helpful practices are presented in the fourth of this magazine's Program for Management on page 103. The hints are designed to improve executive communication and to save time in so doing.

Special targets are the aimless conference, the sterile interview, the nonproductive conversation, the long-winded memo and report. If those abuses alone were corrected in your organization, how much time could you save?

Enough to do your job?

Walter J. Campbell

MANAGING EDITOR


LOWERS COST
OF FINISHED PARTS
...HERE'S WHY
Increases production as much as 200%.
Cuts 25% to 75% faster than comparable standard analyses.
Lengthens tool life from 100% to 300%.
Retains strength—lead has no known effect on mechanical properties.
Machines to excellent finish, exceptionally bright and smooth.

Announcing NEW RYCUT 50, *a leaded alloy*

fastest machining alloy steel in its carbon range

Here's a medium carbon alloy steel which for the first time combines the high mechanical properties needed in heavy duty applications with the free-cutting characteristics of a carbon manganese steel.

Shop after shop has saved up to 75% in machining time, lengthened tool life by as much as 300% and increased production up to 200% after switching from a standard medium-carbon alloy to New Rycut 50.

The secret lies in the addition of a very small amount of lead (.15% to .35%) by a patented process. Finely dispersed, the lead acts as a lubricant between steel and cutting tool—giving greatly increased machinability without known effect on mechanical properties—the hardenability of New Rycut 50 compares with that of AISI 4150.

You can get quick shipment of New Rycut 50—annealed or heat treated in rounds of many sizes—from your nearby Ryerson plant. For worthwhile savings, try this remarkable alloy in your shop for production or maintenance applications.

Also on hand at Ryerson—two other leaded alloys: Low carbon Rycut 20 and medium carbon Rycut 40. Also Ledloy, the fastest cutting carbon steel.

Principal products: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

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A nearly comleted antitrust study may mean . . .

FTC To Get Tougher on Mergers

MERGERS will be in a brighter spotlight soon—in the next couple of weeks, perhaps. Coming up is the Federal Trade Commission's economic report. Since last October, it has been studying corporate mergers and acquisitions.

Investigations Coming—The report may touch off investigations of mergers and acquisitions of recent origin. Already appointed is a task force to look into the most significant of them. Appointed by FTC Chairman Edward F. Howrey, it is a 12-member group of attorneys and economic experts of the FTC. Its chairman is Robert M. Parrish, FTC secretary. The group will work under the immediate supervision of FTC's executive director, Alex Akerman Jr.

Industries most likely to be covered in the report are primary metals, automotive, nonelectrical machinery, chemical, textile, baking, dairy and other food products. Those are the groups in which Chairman Howrey says merger activity of late has been particularly strong.

Not Bad Per Se—Even though a company may be investigated as a result of the forthcoming report, it won't necessarily be prosecuted. Chairman Howrey says: "The 'urge to merge' is neither bad nor good per se. Competition may be injured by some mergers and revitalized by others. Each case must be examined on its individual merits.

"The Congress, the business community and the people are united in wanting fair and vigorous competition, whether it be accomplished by mergers or by their dissolution."

Chairman Howrey feels that the study will enable the commission "to turn the light of fair and considered judgment on those current mergers which threaten fair competition." A good bet: The study will not recommend a get-tough policy, but it will advise a get-tougher approach.

Eye on Steel — Meanwhile, the Department of Justice is keeping its eye on the proposed merger of Youngstown Sheet & Tube Co. into Bethlehem Steel Corp. The department has refused to approve the merger and said it would take legal steps against its consummation. The next move, if there is any, will have to be by the companies, a spokesmen for the Justice department says.

Although mergers have drawn a lot of attention lately, Chairman Howrey doesn't feel the recent wave is as great as some of the earlier ones, explaining: "My own personal speculation is that, taken by itself, and in terms of the relative share of the economy involved, the recent merger wave may not be quite so significant as that of the 1920s, and does not compare with the trust-forming era of 1887-1904."

Different Reasons — Chairman Howrey says it has been suggested that most of today's mergers were initiated by management rather than bankers or financiers. "If so," he says, "this distinguishes the present movement from the former where the so-called trusts were usually put together by bankers who offered securities to the public 'so thoroughly watered' that it took a generation of industrial growth, the inflation of a world war and a nationwide depression to dry them out."

Classifying mergers into three groups (horizontal, vertical and conglomerate), Chairman Howrey says that many acquisitions appear to have been of the conglomerate type—a combination of companies engaged in dissimilar businesses. "This suggests that the desire for product diversification may have been an important motive behind the merger movement," he says.

In the primary metals industry (aside from the proposed Bethlehem-Youngstown merger), the principal acquisitions have been by what might be regarded as medium-sized or even small companies buying up still smaller firms.

For 1956: $500 Billion Economy

PROJECTED FOR:	1955	1965
Gross National Product	$365 billion	$500 billion
Population	165 million	185-190 million
Labor Force	68 million	75 million
Steel Ingot Demand	105-110 million tons	150 million tons

THE MEN who advertise and sell the nation's industrial and consumer products are setting their sights on a $500 billion economy for 1965.

This estimate, based on the assumption that U. S. military preparedness will be maintained at current levels, was presented at a National Industrial Advertisers Association (NIAA) panel session in Washington.

Going Up—Spending for goods and services this year (gross national product or GNP) will reach $365 billion, a gain of 30 per cent since 1946. In the next ten years, the increase will be an estimated 37 per cent.

Panel members, who "grew up" in advertising and sales work, were: Bennett S. Chapple Jr., assistant executive vice president-commercial, U. S. Steel Corp.; L. S. Hamaker, general manager-sales, Republic Steel Corp.; J. M. McKibbin, group vice president-consumer products, Westinghouse Electric Corp.; and E. C. Tudor, president, I.D.E.A. Inc., producer of transistor radios and electronic products.

Panel Predictions—To sustain a more dynamic economy, plant and equipment spending will move to 10 or 11 per cent of GNP in 1965. Other capital investments, such as housing, overseas balances and inventories, will remain at about 3 per cent. The government will probably take a smaller "bite of the pie"—dropping from 22 to 18 per cent. Consumer spending will increase to 68 per cent, a 3 per cent rise.

What will cause this expansion? U. S. population in 1965 will be 185 to 190 million. This represents 20 to 25 million more customers. The labor force will increase from its current total of 68 million to some 75 million by 1965. And the long-term 2½-per cent annual increase in productivity is expected to continue.

Steel Up, Too—Peak demand for steel ingots in 1965 will be 150 million tons, a 35 per cent increase over the record year of 1953. In the next ten years, 10.6 million homes will be built. Electrical appliance sales for the next five years will be 428 million units. Total for the last five years: 353 million units.

Wiring — Installed electric capacity is over 100 million kilowatts. This figure will be doubled by 1965. One problem for electrical expansion is that 25 million homes need new wiring to accommodate the 56 classes of appliances available today. Some 15 years ago, there were only 36 classes of appliances.

NIAA panel members point out that business failures during this expanding period will be traceable to poor planning, insufficient financing and inadequate knowledge of the market.

Product Decline—As an example of what can happen to a market: Almost every home had an orange juice squeezer ten years ago. The average American bought 55 lb of fresh citrus fruit annually. Now he buys only 40 lb. A new product, frozen canned juice, has made the difference. Frozen juice sales have gone from one-tenth of a pound per person to 11 lb each year.

Closer integration of product design, production and marketing will provide business with "insurance." A recent survey reveals that 81 per cent of all the new products developed by 200 companies failed to sell. Reason: There was a lack of sound marketing information.

Sales Future—The panel points out that too many advertising and sales managers think in terms of a single sale rather than in the development of "customers." Effective advertising is the air force of selling. It helps to soften a broad section of potential customers.

No Business Dip in Chicago

The April report of the Business Survey Committee of the Purchasing Agents Association of Chicago shows that business in that area is continuing toward a banner year.

Over-all inventories for the month continued to increase. Half the association members reported delivery slowdowns due to increased business demand. Employment reached an all-time high (less than 1 per cent of the companies surveyed reduced their personnel).

Purchasing agents also are moving out of the hand-to-mouth bracket. They are buying on a 60-to-90-day or 90-day-and-up basis. Profits for April: Some 93 per cent had as good as or better profits than in March.

What's a Small Business

The Small Business Administration is revamping its definition of "small business" as applied to procurement. The present policy of "any company with less than 500 employees" has been found too arbitrary. On May 16, all governmental agencies interested in procurement will be asked to state their views of what the definition should be. As soon as possible, policy will be formulated, presented to congressional industrial committees for comment, then published in the *Federal Register*.

Cold Air Men Confer

The Federal Trade Commission will stage a trade practice conference for the refrigeration and air-conditioning contracting industry on May 20 in the Press Gallery of the LaSalle Hotel, Chicago.

Object: A comprehensive set of trade practice rules to eliminate unfair methods of competition.

Screw Machine Parts Sales To Climb

1960*	$672 million	1954	$400 million
1955*	$440 million	1953	$600 million

*Estimated by STEEL; source for other figures, National Screw Machine Products Association.

Renaissance in an Old Industry

AN INDUSTRY that's taking a long look at itself is finding a somber picture.

But contract manufacturers of screw machine products believe their critical self-appraisal is paying off by leading to improved managerial techniques. They, in turn, can bring a renaissance to an industry which practiced automation as long ago as 1873, when the first automatic screw machine was invented.

The View—Orrin B. Werntz, executive vice president of the National Screw Machine Products Association, sketched proof of diffusion in the industry for delegates at the organization's Buffalo convention.

He reported: 2300 companies now, compared with 1200 in 1947; more captive-shop competition now, with 5400 shops operating at least 30,000 screw machines today, compared with 20,000 during World War II; more job-shop capacity, with 22,000 machines now, compared with 17,500 in 1943.

The diffusion has brought a dramatic slide in the net produced and sold hours per machine in job shops. In 1926-1929, the net was 2140 per year. That fell to 1900 in 1936-1939 and to 1775 in 1946-1949. The slide resulted in a parallel skid in profits—8.6 per cent before taxes in the late 1920s (and no taxes), 7.2 per cent in the late 1930s (and some taxes) and 6.4 per cent in the late 1940s (and plenty of taxes). In terms of 1929 dollars, the average sales volume per company in 1947 was $113,000, compared with $380,000 in 1929.

Solutions—In the face of such statistics, what can be done? Plenty, says E. W. Schneider, new president of the association and vice president of Hudson Screw Machine Products Co., Chicago. "It all boils down to better management," he points out. "We are paying more attention to marketing research and selective selling. We are developing more sensitive cost controls, better plant layouts and improved industrial relations."

Those were the subjects concentrated upon in conference sessions at the group's convention. Reviewed was a survey that disclosed 740 different items containing screw machine parts reported by 868 users. The industry has an estimated 20,000 customers.

Silver Lining—Although captive shops are a problem, only 800 of the 5400 have more than 20 employees. Although the number of job shops is a problem, only 400 of the 2300 have more than 20 employees.

"And better management pays off," says Mr. Werntz, "Although our average before-tax profits have dropped to 6.4 per cent, the top 30 per cent of the firms reporting have earnings that average 12.4 per cent. That kind of improved management, plus the natural growth in demand for our products (see table), will be our industry's salvation."

Fruehauf Sales Hit Peak

Roy Fruehauf, president of Fruehauf Trailer Co., Detroit, predicts the best first half in the company's history. Its sales for the first six months will be over $100 million. Recent orders for 1440 civilian commercial trailers total $8 million.

Chrysler Corp.

Bread and butter approach to labor relations explains . . .

Case of the Missing Lunch Box

"WE'D RATHER have our men leave their salami sandwich at home. The cost of providing a hot meal in the plant is richly repaid in labor harmony."

That's the consensus of big-plant management. Smaller ones are having similar experience.

Why "Inplant?" — One small midwestern auto parts manufacturer daily disgorged its workers into the neighborhood cafes for lunch. For many, lunch included a beer. For some, one beer led to another. Result: Workers frequently returned from lunch late and resumed work with impaired efficiency. Some didn't come back.

Inplant feeding isn't an automatic solution. Poor worker performance often can be traced to inadequate facilities. That's due to the obvious, but often overlooked, fact that long waits in line, poor food and unpleasant eating conditions deprive workers of much of the renewed vigor which their noon respite should bring.

Helping Hand—Firms like Fred B. Prophet Co., Detroit (its sales have grown from $6.6 million in 1946 to a high of $19.6 million in 1953) make a business of giving catering counsel to any company with a food problem. Operating 123 units in 23 states for firms like General Motors Corp., Firestone Tire & Rubber Co. and Westinghouse Electric Corp., Prophet is equipped to foresee your requirements and to set up and operate suitable facilities.

Prophet, and many similar concerns, tailor their services to the needs of the client company. If it's a big company, they might contract for the entire operation, assuming all liabilities and taking any profit. For a small company, which has to subsidize the feeding operation, they often act as managers.

Focus—There's little doubt that problems are increasing. One factor is the trend toward plant location on the outskirts of town. Firms which had depended on outside facilities are forced to cope with the feeding problem for the first time. A second major contributor is the trend in plant design toward one-story structures.

There are few final answers. Workers will not walk more than 800 or 900 feet to a cafeteria. Thompson Products Co., Cleveland, and many other large concerns have been obliged to put in additional facilities, one of the reasons for the gain in popularity of automatic vendors and mobile wagons.

Alternatives—Though a wagon can't be beaten for cutting walking distance, and though vending machines are cheaply moved if plant layout is changed, both present a problem in plant housekeeping in terms of scattered litter. Neither provide the comfort or the ready-made meeting hall that you get in a cafeteria.

Fred B. Prophet Co.'s James E. Rather, director of operations, sums up: "Every plant's feeding problem is unique and requires a tailored operation for maximum efficiency. The skills of food management are as exacting and complex as the skills of industrial management."

Containers: Big Sheet Users

Steel shipping container makers, the nation's second largest users of sheet steel, turned out close to 100 million containers and pails in 1954. Of the total, 22 million containers (13 gallons or larger) were made in 19-gage (or heavier) steel; lighter than 20-gage steel was used in making 7.7 million of such containers. Production of pails (12 gallon capacity or less) totaled 67 million.

New U.S. Tool Buying To Start

Washington has four programs: For the armed services, for mobilization-day needs, for elephant tools and for equipment to make marine turbine and reduction gears

FIRST CONTRACTS under the Air Force's $84-million program to buy machine tools should be awarded in the next few days.

Awarding will continue until $10 million to $12 million worth have been ordered by June 30. The remainder is scheduled to be ordered by next Dec. 31.

For Emergency—Machine tools to be bought are those that would be needed in a defense emergency to produce equipment for the Air Force. Some of these tools already exist but not in numbers sufficient for an all-out emergency. Some of them would require a year or two to build; the Air Force wants to have them on hand, so they could go into immediate production, if needed.

Five different types of machine tools have been put into the program: Skin mills, spar mills, profilers, horizontal boring mills and stretch presses.

To Aid Builders—The tools probably will not be purchased on the basis of lowest bids. An attempt will be made to spread the business across the board.

The Navy and the Army also are buying machine tools under this program. The Navy has approximately $14.5 million, some of which already has been committed. It expects to commit the rest by Dec. 31. The Army's portion in this program is $1.5 million.

More Coming—If the services do not use all the $100 million this year, they will put the unused portion into another fund which can be spent in future years. It is expected that every effort will be made to commit all or most of this, lest it affect the proposed $100-million package for 1956.

Three other machine tool programs are being studied: 1. The marine turbine and reduction gear rounding-out component program of about $64 million. 2. An overall machine tool industry program based upon Defense department requirements. 3. The elephant or long lead-time tool purchase program.

Action Ahead—Of the $64 million in the marine turbine and reduction gear program, about $45 million will be for machine tools and the rest for plant facilities. Dr. Arthur S. Flemming, Defense Mobilization director, promised that he will take action on this program immediately after he appears before Congress for extension of the Defense Production Act.

The over-all machine tool industry program, which is designed to cover mobilization-day machine tool requirements of the Defense department and a portion of the defense-supporting industry, would require more than $1.8 billion worth of tools. Only a portion of these would be bought immediately; a further look at needs would be taken a year hence.

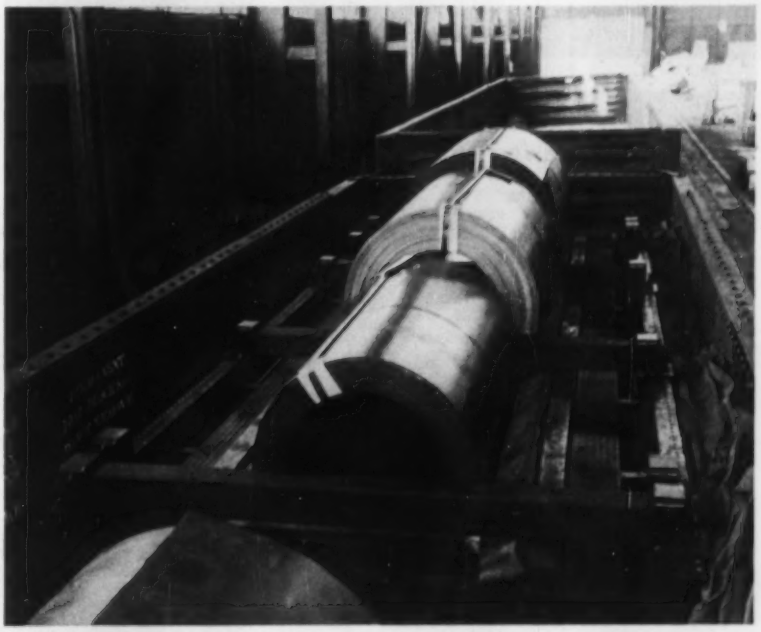
Elephants — Tools in the elephant program are those primarily for defense-supporting industries and are larger than those required by the Defense department and normal defense suppliers. Approximately $72 million worth of tools are in this program submitted to Dr. Flemming. The Metalworking Equipment Division of the Business & Defense Services Administration recommended that the elephant tool program be implemented now and in the full amount.

Allis-Chalmers Expands

Allis-Chalmers Mfg. Co. will spend about $10 million this year for capital expansion. Robert S. Stevenson, president, said most of the money is for electrical and construction equipment operations.

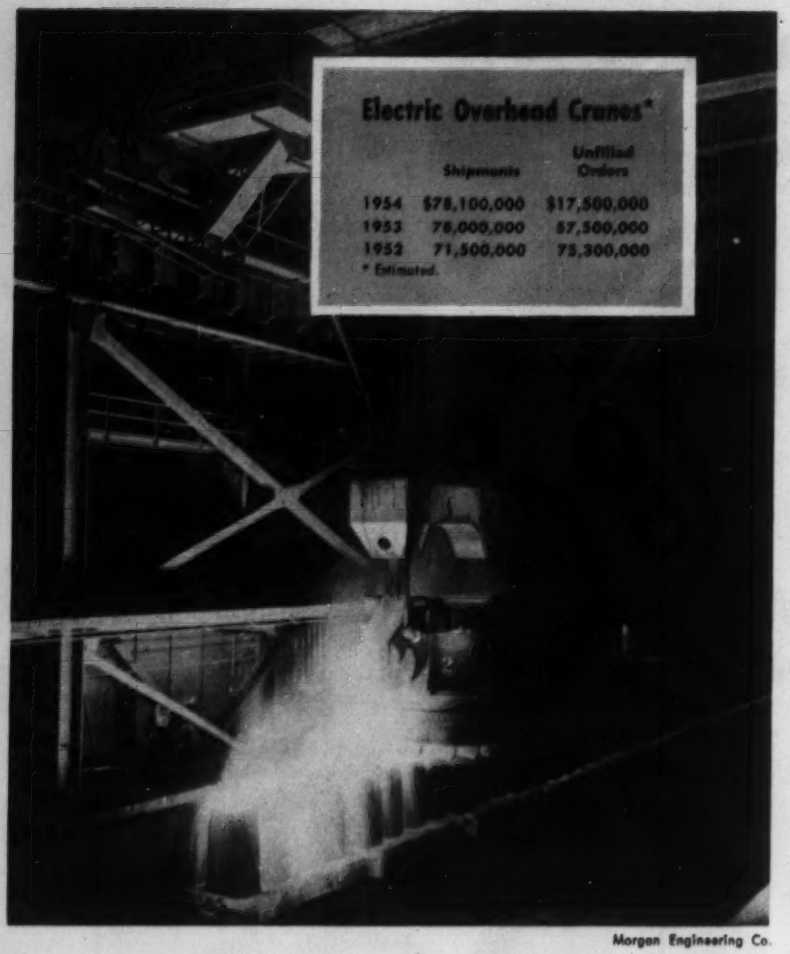
Ford Builds in England

Ford Motor Co. Ltd., will spend over $168 million to expand its production facilities. To meet an expected increase in demand, construction will include a new foundry, press shop and assembly buildings at Ford's Dagenham, England, plant.



Special Gondola Car Handles Six 72-in. Coils

The Nickel Plate Railroad says "Coil Cars" have these advantages: Larger shipments are handled, loading and unloading time and expense are reduced, individual wrapping of coils is eliminated, blocking and dunnage are not needed and damage is minimized. Three of them are in service, and 25 more are being equipped with required skids and special equipment. They have a load capacity of about 140,000 lb of steel coils. A tarpaulin covers them



Morgan Engineering Co.

Sparked by renewed capital equipment spending . . .

Overhead Crane Prospects Pick Up

SIX MONTHS ago, business was getting uncomfortably off balance for overhead crane makers. To keep sales running at 1953 levels, the industry had to cut order backlogs below a safe level (see table).

Makers say they need at least six months in firm orders to stay healthy. By the end of 1954, backlogs were under three months, but inquiries started taking a turn for the better.

Going Up—The acceleration carried through into this year. Helped by new tax depreciation schedules, more capital spending plans are being finalized, and many of the earlier inquiries are firming into orders.

Robert F. Rice, Whiting Corp., Harvey, Ill., says: "Inquiries have been coming in at the highest rate since the early months of 1953. While many of them are doubtless for long-range planning, crane business should be much higher than it was during most of 1954."

Confirmation — W. H. Morgan Jr., president, Morgan Engineering Co., Alliance, O., remarks: "Potential business looks better than at any time in the last three years." A spot check of other manufacturers (there are over 30 in the industry) bears him out. Most see some betterment in store.

Buying in volume are steel producers (which usually head up the customer list), automakers, public utilities, mining companies, metal fabricators and electrical equipment makers. Aluminum, glass and petroleum people also are digging in their pockets again.

Exports—Some increase in foreign sales is anticipated this year as trade to South America and Mexico picks up. Last year, crane exports accounted for about 5 per cent of total sales, down some from recent yearly averages. Euclid Crane & Hoist Co., Cleveland, selling through distributors, estimates foreign sales at 10 per cent of its total.

Industry Problems—One leading maker feels the big problem is to produce a satisfactory crane at lower cost. Potential customers, he adds, are more price-conscious than ever before. Another maker reports: "The eternal problem is tailoring cranes to meet the individual requirements of customers."

Designwise, more welded construction and increased use of alloy steels are tending to reduce average crane weight, says Harnischfeger Corp.'s F. M. Blum. But extra features that are being added as buyer inducements—magnetic controls, more safety platforms, more guard railing—tend to increase total weight.

Bustling activity in electric hoists and monorail equipment is helping clear up much of the business uncertainty. Some makers expect gains this year of as much as 15 per cent, reflecting substantial modernization of plant facilities, as well as building expansion.

Bearding the Giants

The only foreign auto plant to compete with the U.S. industry on its own ground will be set up by Daimler-Benz in the U.S. by the year end.

The 75-year old German company had sales of $240 million last year. It already has plants in 11 other countries outside Germany, and is currently exporting some cars into the U.S. Carl F. Giese, director, reports: The company, formed in partnership with several American companies, will be known as Daimler-Benz of North America Inc. Initial annual production will be a "few thousand" trucks and busses.

AF Gets Its Presses

A dream in 1951, the Air Force Heavy Press Program is becoming a reality. AF officials are eying plans for more units and a 75,000-ton forge unit

BY FALL, the Air Force Heavy Press Program will be completed. Latest development: Harold E. Talbott, secretary of the Air Force, says Kaiser Aluminum & Chemical Corp. will operate a new government-owned extrusion plant at Halethorpe, Md.

Kaiser, which operates a plant adjacent to the site picked for the extrusion plant, was given the assignment originally. Then the project was opened to competitive bidding. Other bidders were Reynolds Metals Co. and Harvey Machine Co. To be completed by fall, the integrated plant will be equipped with two 8000-ton presses.

Better Break—The AF discloses that the new contract is on terms "substantially more favorable to the government than was originally expected." By seeking competitive bids on a five-year basis, the AF reports that it will receive higher rent, guaranteed annual minimum rentals and agreements to add facilities and absorb abnormal as well as routine maintenance.

Of the ten presses (four forging and six extrusion) in the program started by the AF in April, 1951, three forging and two extrusion presses are in operation (see table on page 132). The largest closed die forging press until early this year was an 18,000-ton unit leased by the AF to Wyman-Gordon Co.

Total Price — Over-all expenditure for the program is estimated at $279 million. This includes presses, facilities and supporting costs (transportation and industry expansion). Example of supporting cost: Some $676,000 was spent moving machine tools into Midvale Steel Co.

Press Future—Aircraft designers already have submitted plans to the AF. They call on the forging presses to make cargo floor bulkheads, cockpit floor beams, landing gear supports and bulkheads, fire walls and engine mounts.

The aircraft industry also will have to design many other parts for the forging presses. Initially, the 35,000 and 50,000-ton units will turn out parts for a fighter plane and a jet tanker. It is hoped that in time they will be able to produce parts for transportation and other civilian industries.

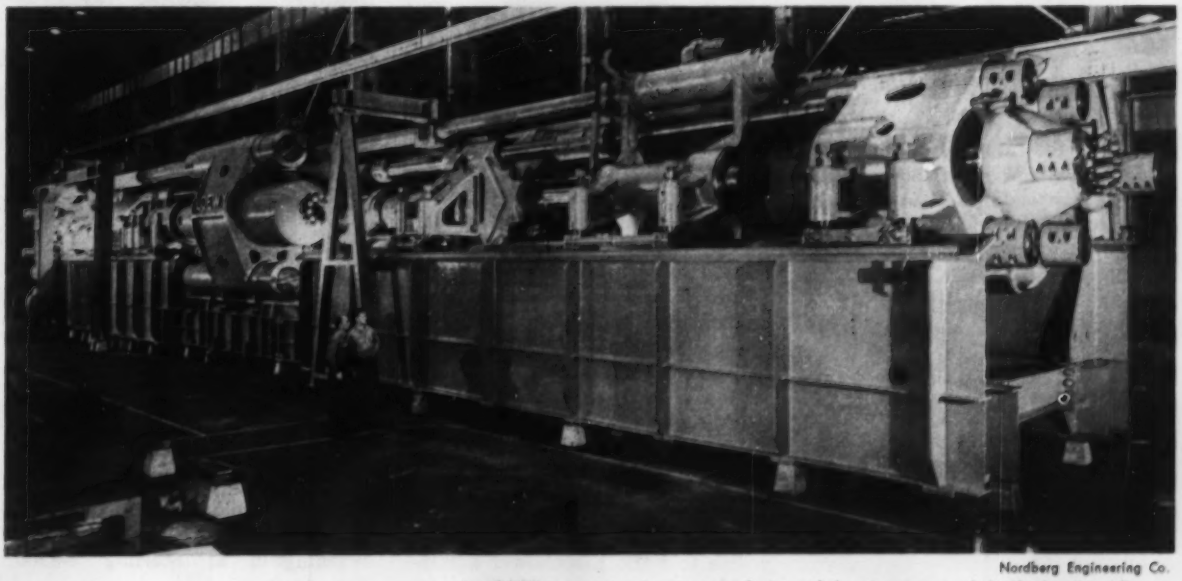
Interest Rekindled—The AF still is interested in at least two presses from the old program (it called for 17 presses instead of 10). Meetings are being held between the Air Materiel Command and Aluminum Co. of America to talk over a 20,000-ton extrusion press. Chances are, if the 50,000-ton forging unit proves its worth, talks will resume on a 75,000-ton model.

"Considering that we in the U.S. have no experience to call upon in a press program of this magnitude, we are making progress at an ever-increasing rate," states Secretary Talbott.

Stockpiling—Not Enough

"A changed emphasis in national stockpiling policy is required to assure continuity of essential production . . ." after an atomic bomb attack, states the National Planning Association, Washington.

It says the current stockpiling of critical materials suits only one possibility, a long war of attrition in which neither side uses nuclear weapons.



Nordberg Engineering Co.

An 8000-ton extrusion press designed by Loewy and built by Nordberg

SEC Plugs for Midyear Report

COMPANIES whose stock is listed on any of the country's exchanges may have to make reports twice a year (rather than once) to the Securities & Exchange Commission.

The commission believes this would be of considerable help to investors.

Outlook—The additional report would have to be filed within 45 days after the end of the first half of a company's fiscal year. These companies now file a report after the close of their fiscal year.

The proposed midyear report would contain specified information about sales and gross revenues, net income before and after taxes, extraordinary and special items and charges and credits to earned surplus. It would not call for a formal statement of profit and loss and earned surplus or require certification.

Review — Quarterly statements once were required by the SEC, but they were discontinued in late 1953. Hearings have been held on the proposal for twice-a-year reporting and studies are continuing.

Rails Ask Rate Relief

The Chesapeake & Ohio Railway applied to the Interstate Commerce Commission for relief on freight rates on carloads of blast furnace coke from Ashland, Ky., to Hammond, Ind., Chicago and points in the Chicago district in Illinois and Indiana. The application was on behalf of the C&O and the Elgin, Joliet & Eastern Railway. They cited competition as the cause for the application.

Tooling for Defense

A program that would ready the gage, cutting tool and tool and die industries for defense mobilization is being started in the Metalworking Equipment section of the Business & Defense Services Administration.

Heading up that program is Albert F. Polk, a vice president of Sheffield Corp., Dayton, O., who just started an assignment in Washington.

Until now, the BDSA Metalworking Equipment section has concentrated mainly on machine tool needs for an emergency. Now that the work is well in hand, the section is giving increased attention to other segments of the metalworking equipment industry.

Washington Whispers

The House Appropriations Committee told the Eisenhower administration to consult with Congress before it transfers any more governmental functions to private industry . . . Spencer S. Shannon of Bedford, Pa., is the new director of the Office of Minerals Mobilization, Department of Interior . . . A Bureau of Mines report says locally available materials can be used to produce pig irons meeting the needs of the foundry industry of the Pacific Northwest . . . Bethlehem Steel Co.'s shipbuilding division was authorized by the Federal Maritime Board to convert four Mariner ships into vessels to meet trade needs of the American President Lines' round-the-world service . . . The Federal Power Commission reports the rate for combustion of coal for production of electrical energy in the U. S. dropped to an all-time low of 0.96 lb per kw-hr in March . . . More than 100 pieces of equipment made by 97 American manufacturers are on display at the joint U. S. Industry-Government central exhibit at the First Tokyo International Trade Fair.

Meet Thomas Moore: He's the Business & Defense Services Administration's new director for iron and steel. He comes to Washington from Brainard Steel Division, Sharon Steel Corp., where he was general manager. His industrial background: Steel warehousing and sales. During the war, he rose to lieutenant colonel with the Ordnance Corps. He can be reached in Washington at Sterling 3-9200, Ext. 4412.

Flex-Roll Processing

Absolutely Essential

FOR BETTER DEEP DRAWS

THE Automotive and Appliance industries have long been aware of product improvement due to Flex Roll Processing. Low carbon steel as supplied by the steel mills for deep drawn parts, requires a cold working prior to the press operation, to eliminate stretcher strain, improve surface appearance and minimize scrap losses.

The new McKay Flex Roll Processor combines thorough cleaning with efficient filtering of cleaning fluid and effective cold working of the steel sheet to prepare it for severe deep draws.

McKay engineers will appreciate the opportunity of demonstrating the benefits of Flex Roll Processing.

The compact, neat new McKay Flex Roll unit that requires no special installation. Just set it in place, plug it in and it's ready to go to work.

THE McKAY MACHINE COMPANY
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Another **PRODUCTION SOLUTION**

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Does the Job Best!

A variety of machining operations, unique in sequence, is combined on a new 15-station automatic transfer machine. Grouping standard machine tool units attains maximum production and utilizes automation. In addition, the M. & M. Triple-Chip circular saw cut-off makes possible the use of low cost stock material; increases your ultimate savings. Start by sending us your part drawings for a production solution by Motch & Merryweather.

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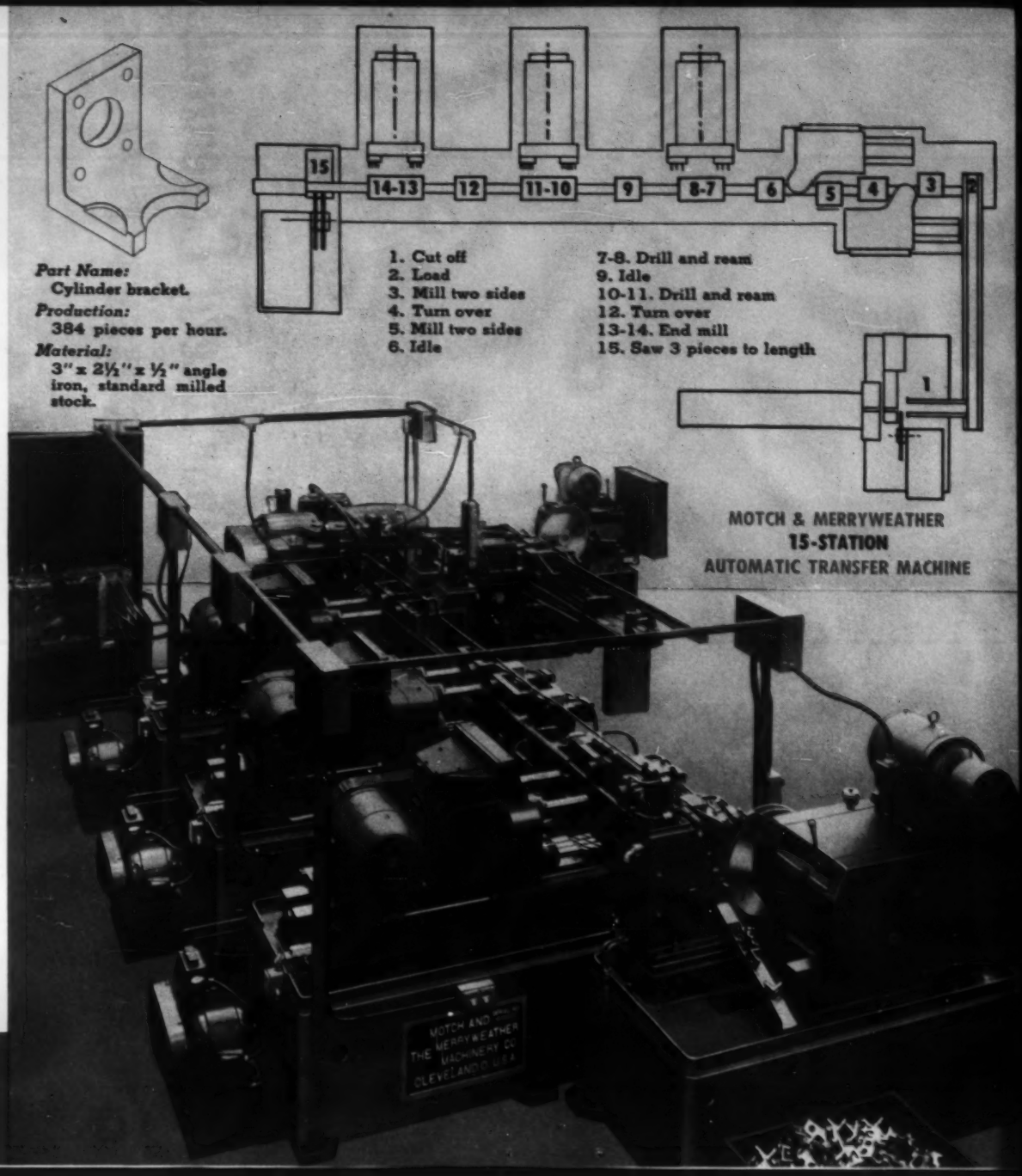

Design for Maintenance, Says Cross' Tech

"TECH certainly is at home in engineering," fellow students used to pun about Kurt O. Tech.

Now vice president-engineering at Cross Co., Detroit, Mr. Tech recalls with a smile that he joined the firm as a drill press operator in 1940. It was shortly after he was graduated from high school . . . "the job permitted me to enroll in night school at Lawrence Tech," he explains.

Forerunner—Two years later he was designing machine tools. He continued in night school, completing his B.S. degree in mechanical engineering in 1948.

"My first big job was working on the design of a shell lathe during the war," reminisces Mr. Tech. "Development of a hydraulic handling device made that machine a forerunner of the automated equipment we build today."

Creative—Kurt Tech observes: "During the war, we were too busy building equipment to spend much time developing the ideas we had." By 1946 the company was in a position to concentrate on creative work again, and he was made chief engineer, a job concerned directly with the design of machine components.

In earlier days, Cross Co. built mostly standard machines with adaptations for specialties. Today, most are built for a specific job. To keep costs down and make maintenance easier, the equipment is designed around standard components as much as possible. That has meant a complete revision of standard components since 1945. New equipment developments are continually checked for possible savings in space or equipment operation.

Theme—"The concept we follow is to design for maintenance," Mr. Tech points out. "Earlier attempts at automation often required dismantling the entire machine just to change an oil seal. Hydraulic valves were inside a machine where it was assumed they would be safe. They were safe all right, but maintaining them was a big job.

"Wherever possible we now mount our valves away from the machine, generally on hydraulic power units. They are out of harm's way and by keeping them in small groups, we haven't increased our piping runs much. A hydraulic valve can be removed in 1 minute, a hydraulic cylinder in 5."

Significance—Though most people are impressed with the size of automated equipment, the successful engineer is the one who can retain the concept of the unit without losing the significance of small details, believes Mr. Tech.

To facilitate this approach, Cross Co. has a big engineering staff. Totaling seven when Mr. Tech started with the company, it now boasts 100 people. It's divided into three divisions. The first, working with sales, deals with the preparation of proposals to the customer; the second, with productive engineering; the third, with future development engineering.

Here's Marvibond*

a new vinyl-to-metal laminating process that gives sheet metal products all these advantages...

- lasting protection against rust and corrosion
- practically any surface effect desired
- superior abrasion resistance
- outstanding resistance to perspiration and most chemicals
- uniform coverage of almost any thickness
- good sound-deadening properties
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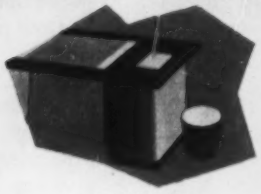
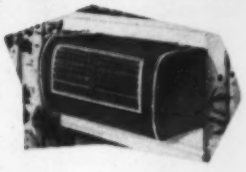


waste baskets

business machine housings



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Window moldings and dashboards of Marvibonded laminates could be permanently clad with vinyl material to match door upholstery and seat trim. And practically any choice of texture is possible–from glare-free matte finishes to rich leather-like grains.

There'd be no checking or flaking, no worries about scratched paint—no need for waxing or other care. The tough, chemical-resistant vinyl cleans with a wipe.

What's more, the vinyl surface would always be warm and pleasant to the touch. Marvibonding ends problems of rust from moisture condensation. And it helps to deaden sound, as well as insulate against squeaks from metal to metal contact.

Why not Marvibonded panels and trim! Plenty of excellent reasons *why*. Excellent reasons why for hundreds of similar applications—like radio and television housings, business machine covers, vending machines, air conditioners, waste baskets, and many many more.

Better see what Marvibond can mean to your product! Write the address below today.

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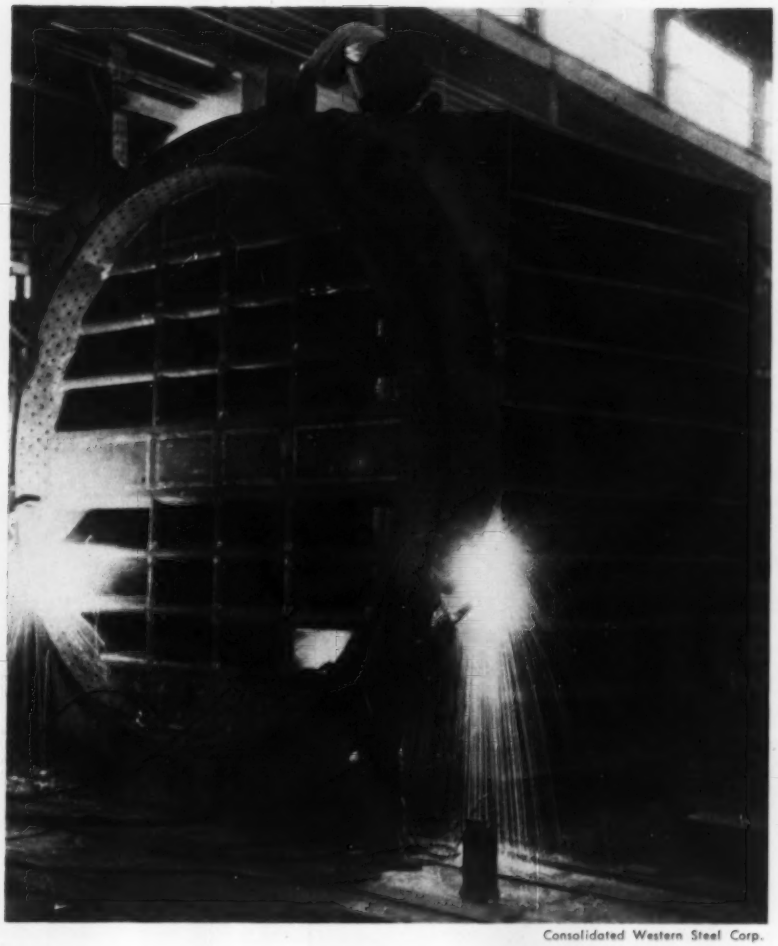

Consolidated Western Steel Corp.

Weldment Sales: Getting Hotter

WELDMENT INDUSTRY'S outlook: Business is "hectically" good for some, just getting under way for others.

Louis T. Kenney, vice president and general manager, United Welding Co., Middletown, O., reports that first quarter sales increased 27 per cent over the corresponding period a year ago. United's weldment activity is centered on machinery and press parts, pressure vessels, diesel engine crankcases and parts and stainless steel bases. The company handles weldments up to 50 tons.

Owned and Unowned — Companies making weldments are in two main categories—captive and job. Frequently a company is both. The U. S. has several hundred medium-sized shops and innumerable small units, and almost every structural steel and plate fabricator makes some weldments, but only 10 or 12 commercial weldment producers gross $100 million.

Beginning Slow — Some manufacturers are still struggling to get a start. R. C. Mahon Co., Detroit, whose production is concentrated on machine tools and heavy machinery, made 20 per cent fewer sales in the first quarter of this year than it did in the same quarter last year. Its estimate for '55: Sales are picking up and will continue to do so.

Weldments range from a few pounds to several tons. Shops turning out large units must use heavy handling equipment — cranes, bending rolls, shears, welding positioners, etc. Weldments can be done as special jobs or in production runs. For long runs, jigs and fixtures are used for economy.

Other applications for weldments include: Printing presses, earth-moving equipment, locomotives, mining machinery and gear blanks. Many weldments involve a combination of castings and rolled or wrought steel.

Optimistic — William Pearse, general sales manager, Lewis Welding & Engineering Corp., Bedford, O., says: "Our first quarter was 30 per cent better than the first quarter a year ago. I feel that we will do 50 per cent better this year than last. While inventories are normal for our average rate of business over the last two years, a 50 per cent increase in this year's sales will put steel on the critical list. Deliveries already have tightened from 6 to 12 or 14 weeks."

Lewis does weldment work on basic frames for machine tools, special machinery, materials handling equipment and off-the-road truck units. The firm has a new government contract which will add to total sales, but the military work is not being included in the sales estimates or percentage increases for the year.

While most producers do not have defense contracts now, the industry is still "welding the seam" on one of its best sales years.

Congress Eyes Automation

A congressional joint economic subcommittee, headed by Rep. Wright Patman (Dem., Tex.), plans to study problems arising out of the trend toward automation.

Mr. Patman believes there may be "important impacts upon levels and stability of employment as well as upon plant and equipment expenditures and consumption potentials."

The subcommittee, which will be helped by Labor department case studies, will cover such subjects as displacement of workers, new investment needs and added products for consumption. Automation experts from industry will participate in the panel discussions.

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CUT MASTER
VERTICAL TURRET LATHE

This revolutionary new design of vertical turret lathe has exclusive features never before offered on machines of this type . . . takes full advantage of the latest improvements in cutting tools and methods . . . truly the machine with a "built-in" future.

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AVAILABLE IN 26, 36, 46, 56, 66, AND 76 INCH SIZES

PENDANT CONTROL . . .

provides maximum machine control from a movable pendant station. Start and stop spindle; selection of speeds, feeds and directional movement of all heads in feed or traverse are quickly and easily accomplished from the Pendant. Interlocks and a stopall stick provide safety for both operator and machine.

SCREW FEED . . .

is provided for vertical and horizontal motion of all heads—to assure fine, smooth finishes with greater accuracy.

POWER INDEXED MAIN TURRET . . .

(Optional) Five sided turret for "run of the mill" jobs. Four sided turret for production jobs.

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In the works are engine air cleaners, one of AC's many products

GM's AC Division Gets Around

"EVERY CAR AND TRUCK made in the United States today has at least one AC product on it."

That's the claim of AC Spark Plug Division of General Motors Corp. which also produces such automotive garnishments as oil filters, fuel pumps, air cleaners, silencers, radiator caps, gasoline and oil strainers, gages, flexible shafts, speedometers and instrument panels. All this, of course, is exclusive of such electronic military items as gun-bomb-rocket sights, navigational computing systems for bombing and an electronic fire control system.

History—To understand the evolution of GM's you-name-it division, one must go back to 1908 when a French motorcycle and automobile racer decided to risk his neck in the sport of business by manufacturing spark plugs. This chap, Albert Champion, enlisted the aid of such worthies as W. C. Durant in founding his Champion Ignition Co. Durant at the time was in control of Buick Motor Car Co. and hoped for a responsible source of spark plugs.

To get into production quickly, a second-floor room in the Buick plant was set aside for the machining and threading of the steel shells and gland nuts which were assembled with insulators imported from France to form the spark plug. Growth of the auto industry quickly increased the employment over the original crew of 15 men. During World War I, AC developed an aircraft spark plug which reached a volume of 50,000 plugs a day by war's end.

Growth — Following the war, AC expanded its activities by entering the speedometer business, the first of some 30 additional major products which have led to its claim: The largest automotive accessory producer in the world today. Typical are such nuggets as air cleaners, which the company put into production in 1925. The next year it added diecastings, oil filters and gasoline strainers.

In 1927, AC began to manufacture its fuel pump, and for many years it built the world's output—a fairly hefty sort of chore in itself. Also in 1927, the full line of instruments was started. Added to the speedometer were ammeters, oil pressure gages, water temperature gages and an almost forgotten device in passenger cars, the tachometer, to indicate engine revolutions per minute. In 1928, AC began building complete instrument panels and the same year started making breathers for crankcases.

Into the Family—With a finger in too many pies to be ignored, AC became a division of General Motors Corp. in December, 1929, just one month after Harlow H. Curtice, its general manager until 1933, took

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over. Someplace along the line, Albert Champion had hopped a fast horseless carriage to Toledo, O., and started a deal called Champion Spark Plug Co., which continues to offer unfraternal competition to Al's first born.

During World War II, in addition to aircraft spark plugs, AC with its instrument-making experience was a natural to go into such devices as automatic pilots, bombsights, special instruments and instrument panels, as well as the .50 caliber Browning machine gun. At the peak of war production, AC employed more than 19,000 men and women, and was just getting back to peacetime operations when Korea came along.

Into Electronics—To handle the production of the huge navigational computer for bombing, which it was assigned because of its experience in electronics, the division acquired a plant in Milwaukee. Today, the electronics work continues to be important in the scope of the operations, with a present development pointed toward improved fire control and guidance equipment. On the production side, the Milwaukee plant also is turning out variable pitch blades for the Buick Dynaflow transmission, along with gun-bomb-rocket sights and bombing-navigational computers.

But to return to the automotive end of things. Keeping pace with the equipment needs of GM's better than 300,000 units a month currently occupies the time of a major portion of the division's 17,000 men and women. That employment, incidentally, is larger than some of the car-producing divisions of General Motors. A typical example of production at AC is the air cleaner which the division supplies for all the GM lines.

Growing—Functionally called intake silencers, these are the units conceived as the engine by many housewives owing to their prominence. The size of air cleaners has grown to such an extent that AC's heavy volume today is in 11 to 16-in.-diameter units, compared with 8 or 10-in. units only a few years ago. Increasing in complexity as well, these units have inspired much ingenuity on the part of AC production engineers.

Seven press lines of five presses each have been arranged with a combination of slides and portable conveyors to carry the parts from one operator to the next for blanking, forming, trimming, flanging, etc. As the press operations are completed each part drops onto a central conveyor which carries the various parts to a washer. They are run through the washers on edge to minimize damage. On emergence, they are put into bins for storage or hung on a conveyor for transportation to the assembly area.

Conveyorized—To permit air cleaners to be run in lots rather than in continuous production and to give flexibility for model changes, portable conveyor units are used extensively in the assembly area. Girls remove the parts from the conveyor which also functions as a storage point. They spot weld the parts together, using portable welding fixtures. Now creeping into the line, incidentally, are welders with rollers for a continuous weld which eliminates the need for crimping.

After top and bottom assemblies have been finished on parallel lines, the units are put together on a machine which closes the lock seam on the bottom section, trims and rolls the edge of the top section and drives the wing nut automatically. The clamp is then welded on the bottom of the air cleaner, and the units are painted and packed ready for shipment.

Sidelight—One interesting sidelight is the fact that AC makes its own wire mesh for Buick air cleaners. Fed from spools, the 0.009-in. wire travels through a series of gears which flatten and crimp it, emerging to be wound on reels the size of an air cleaner. Also of note is a new 900-ton press which utilizes a progressive die to turn out a major air cleaner stamping in ten steps and eight working stations, eliminating the already well mechanized interpress transfer of parts.

But you find ingenuity in the manufacture of other AC products as well. For example, you'll find a power-and-free conveyor system in the instrument assembly department. Multitiered trays are loaded with subassemblies in other departments and the destination of the unit is indicated by a dial controlling an eight-position electrical system in the power-and-free unit head. The tray then travels automatically along the conveyor to the proper assembly area where it waits until the parts are required. An interesting feature is the hydraulic mechanism incorporated in the unit which makes it possible for the girls assembling the units to raise or lower the tray as required to reach the parts.

Facet—Interesting, too, are operations in the oil filter and filter cartridge departments. The replacement "can" is formed from pre-enameled coiled stock on a "can" forming machine after blanking on a press, which puts in the holes and cuts off the rectangle required. Meanwhile, a resin-impregnated, paper-like strip is being formed into a tube with a bonded seam and crimped into an accordion-like bellows about 2 ft long on another machine. The metal top and bottom of the "can" are bonded onto the accordion, and the unit is then assembled in another can-factory-type machine and carried to a last machine which folds the box, drops in the instructions and closes the box automatically.

So much for a smattering of AC Spark Plug Division, General Motors Corp., which in all probability built part of your car.

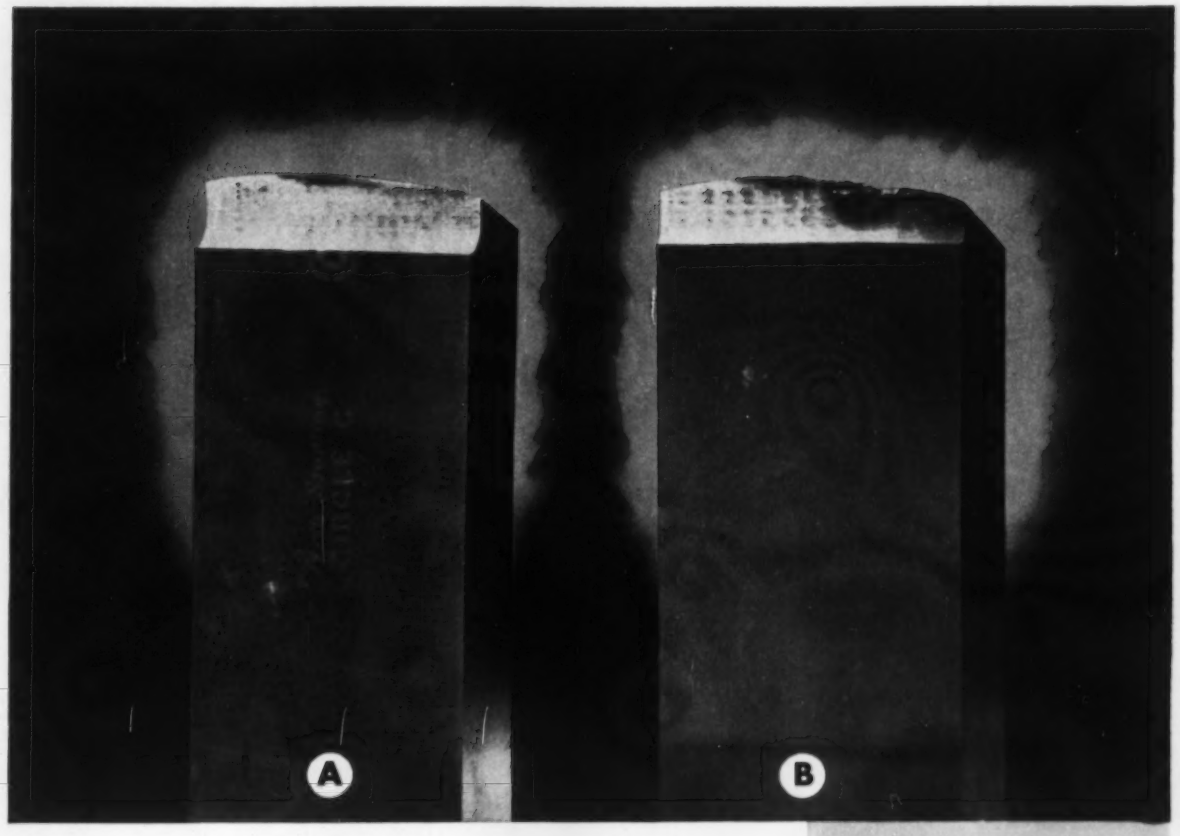
Auto, Truck Output

U. S. and Canada

	1955	1954
January	780,780	594,467
February	770,530	574,215
March	955,027	672,858
April	936,994†	676,269
May		621,262
June		623,732
July		543,540
August		523,799
September		364,441
October		312,078
November		616,395
December		761,954
Total		6,885,010

Week Ended	1955	1954
Apr. 9	207,089	152,086
Apr. 16	218,078	148,559
Apr. 23	225,074	157,710
Apr. 30	231,021	159,206
May 7	220,961†	154,640
May 14	217,500*	153,796

Source: *Ward's Automotive Reports*. †Preliminary. *Estimated by STEEL.



which tool cut leaded steel?

• Right! The answer could only be Tool A which was used on leaded Aristoloy—4140. Tool B was used on non-leaded Aristoloy 4140 under the same conditions.

A comparison of the cutting edges of both tools demonstrates how the freer machining characteristics of leaded steels increase tool life and thereby reduce machining costs. The lead addition acts as a lubricant reducing friction between chip and tool. Tools therefore operate at lower temperature, contribute to better chip formation and eliminate damaging tool edge build-up.

Why not find out what advantages leaded steel can offer you? Call your nearest Copperweld office today for complete information or write us direct.

SEND FOR FREE CATALOG

If you would like specific information about application of lead steel to your product get in touch with your nearest Copperweld office or write us today.

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COPPERWELD STEEL COMPANY

STEEL DIVISION • WARREN, OHIO

For export—Copperweld Steel International Company, 117 Liberty St., New York

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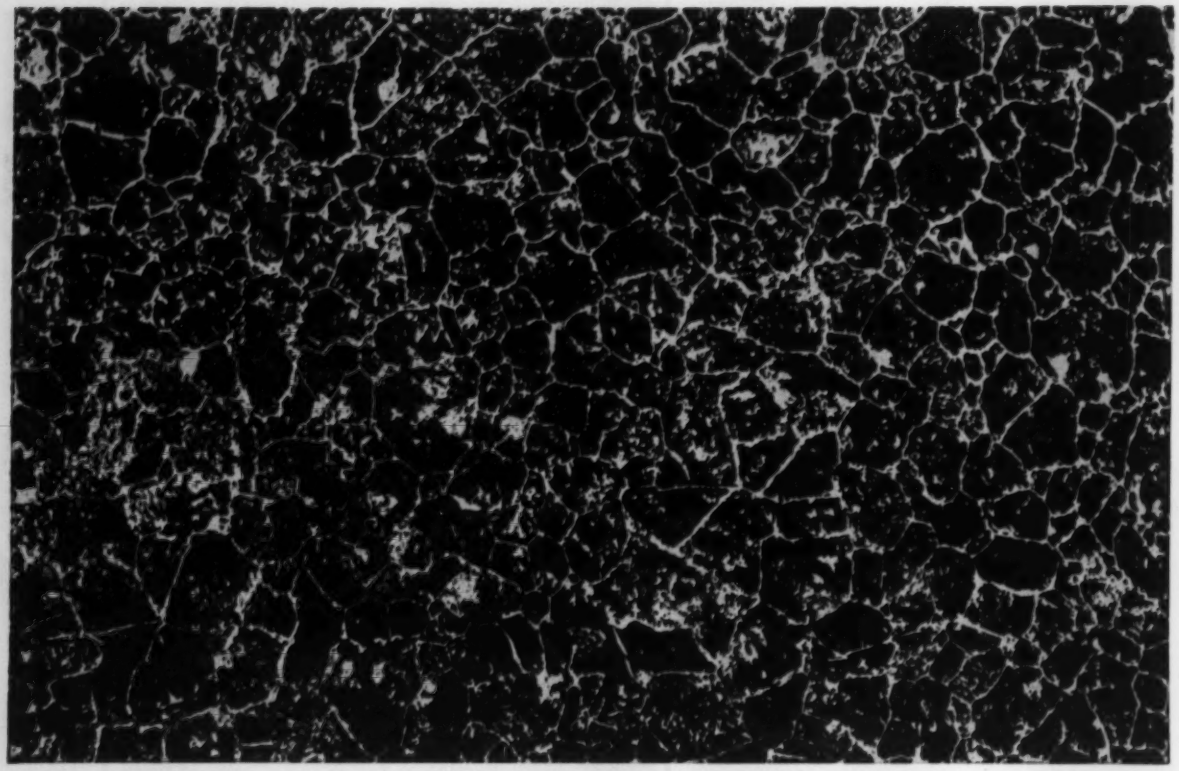
Rochester, New York
117 Liberty Street
New York, New York
711 Prudential Building
Houston 25, Texas
80 King Street West
Toronto, Ontario, Canada
Monadnock Building
San Francisco 5, Calif.
325 W. 17th Street
Los Angeles 15, Calif
First National Bank Bldg.
Jamestown, New York
1578 Union Commerce Bldg.
Cleveland, Ohio
5675 Elston Avenue
Chicago 30, Illinois
1807 Elmwood Avenue
Buffalo, New York
7251 General Motors Bldg.
Detroit, Michigan
143 Washington Avenue
Albany, New York
611 Seury Building
Philadelphia 40, Penna.
625 James Street
Syracuse, New York
3102 Smith Tower
Seattle, Washington



See for yourself why TIMKEN® forging steels give you uniform, high quality forgings

NOTE the uniform grain size in this photomicrograph of Timken® forging steel. We examine every heat of Timken forging steel—spectrographically to assure uniform grain size. As a result, you can be sure that forgings made from Timken forging steels will give you uniformly high ductility and resistance to impact.

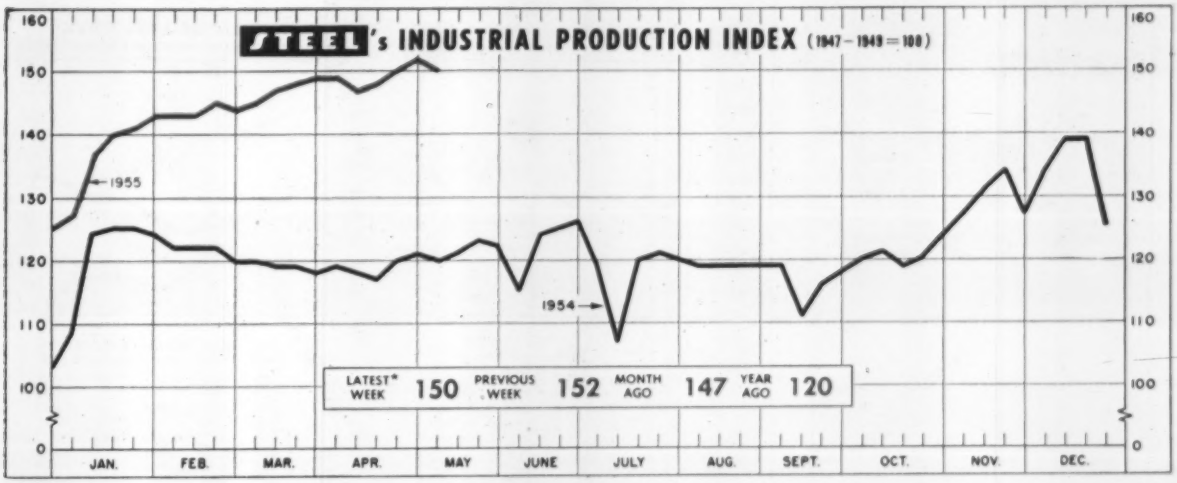
Because your order of Timken forging steel is handled individually in our mill we are able to target our conditioning procedure to your particular forging requirements. That minimizes your rejects.

Every lot of Timken forging steel responds uniformly to heat treatment because every lot has the same physical and chemical properties. For example, we rigidly control chemistry with the help of a direct-reading spectrometer which tells us the exact composition in 40 seconds . . . while the steel is still molten.

To top it off, Timken steel forging bars *save* you steel because their good dimensional tolerances produce uniform weight multiples with a minimum of steel lost in flashings. Get all these results in your forgings. Specify Timken forging steels. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended May 7. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Auto Assemblies 11%.

Business Signposts Continue To Point Upward

SIGNS of continuing good business are plentiful—new orders continue at a good clip, backlogs are going up and employment, which keeps consumer buying high, is climbing.

Manufacturers' new orders and backlogs in March rose to rates equaling previous highs. They were up 8 per cent over February after seasonal adjustment. The gains were widespread throughout the economy, though durable goods industries showed a relatively greater increase than nondurable ones.

Backlogs—Unfilled orders continue to mount, with primary metals and nonelectrical machinery showing largest increases. Sales in March totaled $28 billion, up 10 per cent from last March. Little change is reported in inventories.

From all indications, business is continuing in about the same vein, with sales good, orders and backlogs strong and inventories steady.

Employment—Reflecting the increase in business, employment is striding ahead. From March to early April, employment rose 1.2 million, while unemployment dropped 200,000, say the Labor and Commerce departments.

The jump in jobs to 61.7 million was the biggest for the month since 1946. The drop in unemployment pushed the jobless total below 3 million for the first time this year.

Buying — Agriculture and construction showed their usual spring expansion. Of perhaps greater importance is a gain of 40,000 in factory employment, which usually takes a good-sized drop about this time of year.

The better employment situation shows up in consumer buying. Installment credit increased by $466 million in March, compared with a decline of $201 million in that month last year and an increase of $430 million in 1953, the Federal Reserve Board reports. Big gainer was automobile paper, which accounted for all the boost in addition to making up

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,334	2,331	1,690
Electric Power Distributed (million kw-hr)	9,600[1]	9,699	8,438
Bitum. Coal Output (1000 tons)	8,600	8,610	6,767
Petroleum Production (daily avg—1000 bbl)	6,834[1]	6,836	6,422
Construction Volume (*ENR*—millions)	$389.4	$458.5	$474.0
Automobile, Truck Output (*Ward's*—units)	220,961	231,021	154,640
TRADE			
Freight Car Loadings (1000 cars)	728[1]	730	648
Business Failures (Dun & Bradstreet, no.)	208[1]	212	206
Currency in Circulation (millions)[3]	$29,782	$29,657	$29,756
Dept. Store Sales (changes from year ago)[3]	+7%	+11%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,764	$19,661	$21,234
Federal Gross Debt (billions)	$276.7	$277.0	$271.0
Bond Volume, NYSE (millions)	$19.1	$20.9	$18.4
Stocks Sales, NYSE (thousands of shares)	11,567	12,881	9,936
Loans and Investments (billions)[4]	$84.8	$84.9	$79.1
U. S. Govt. Obligations Held (billions)[4]	$34.0	$34.1	$32.2
PRICES			
STEEL's Finished Steel Price Index[5]	194.53	194.53	189.74
STEEL's Nonferrous Metal Price Index[6]	237.0	237.1	212.2
All Commodities[7]	110.4	110.4	111.0
Commodities Other Than Farm & Foods[7]	115.8	115.8	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

Coming

May 23

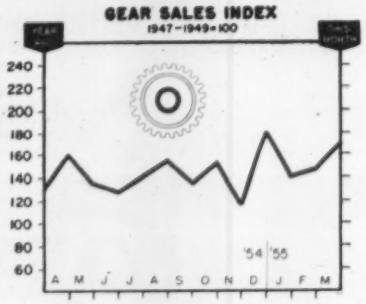
IN

STEEL

More Metalworking Rides on Ole Man River

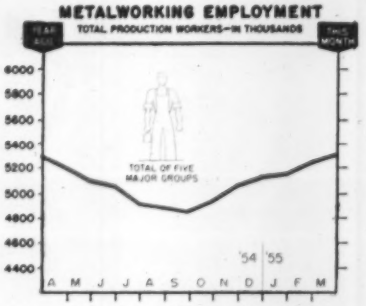
Traffic on inland waterways is growing at a phenomenal speed. This article will explain the reasons, show the effects of the boom on makers of barges and other waterway equipment and take a look into the future.

THE BUSINESS TREND



	1955	1954	1953
Jan.	140.9	167.4	161.4
Feb.	148.5	165.1	188.1
Mar.	172.8	128.6	158.9
Apr.	....	158.2	217.1
May	....	132.5	189.8
June	....	127.4	146.5
July	....	141.3	120.7
Aug.	....	164.7	121.6
Sept.	....	135.1	135.6
Oct.	....	152.3	211.1
Nov.	....	116.7	144.9
Dec.	....	182.2	194.0

American Gear Mfrs. Assn.
Charts Copyrighted 1955 STEEL.



1954	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
Mar.	1,010	852	1,202	827	1,409
Apr.	991	840	1,187	811	1,380
May	976	833	1,165	791	1,342
June	983	831	1,151	776	1,324
July	969	809	1,108	765	1,277
Aug.	968	819	1,093	782	1,237
Sept.	965	820	1,095	802	1,184
Oct.	969	829	1,091	817	1,246
Nov.	988	845	1,091	828	1,324
Dec.	1,002	844	1,106	827	1,365
1955					
Jan.	1,012	836	1,110	818	1,388
Feb.	1,034	844	1,126	821	1,409
Mar.*	1,064	858	1,142	827	1,430

*Preliminary.
U. S. Bureau of Labor Statistics.

declines in other areas of installment buying.

Business: Good Into 1956 . . .

Record business in 1955 and a carry-over into 1956 are predicted by Roy Reierson, chief economist of Bankers Trust Co., New York. He foresees a gross national product of $375 billion, 5 per cent above last year's and 3 per cent above the previous peak of 1953.

Records may be expected in industrial production, construction, retail sales, state and local spending, average hourly and weekly earnings, he says. Record or near-record profits also are in prospect this year, unless there are long, widespread strikes.

Rising plant and equipment outlays, inventory building and public construction will keep business good into 1956. Auto output and home building may slack off after midyear, but the momentum of the rest of the economy will keep things moving for the whole year.

Metalworking Cities Pick Up . . .

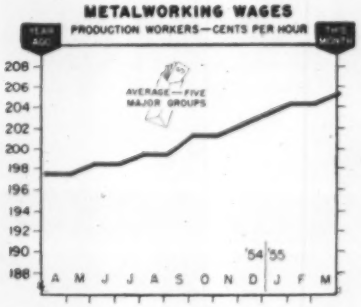
Two important metalworking centers, Pittsburgh and Cleveland, report business is still getting better. In Pittsburgh, activity is highest since late September, 1953, says the Bureau of Business Research, University of Pittsburgh. Most impressive gain is in trade, but industrial production and freight shipments are also up.

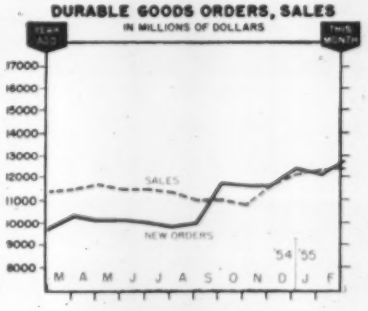
The extent of the business recovery is pointed up by the bureau's seasonally adjusted index of business activity; it's 200 per cent of the 1935-1939 average. A month ago it was 178.9; at the end of February, 173.2. The index hit its recession low of 124.5 in the week ended July 3, 1954.

In Cleveland, automobile sales established another all-time record. Construction is at a two-year peak. Other business indicators are close to the highest levels of recent months, according to the Federal Reserve Bank of Cleveland. Unemployment compensation claims declined by about 1000 for three successive weeks.

With the League Leaders . . .

The auto industry has slowed its torrid pace, with Saturday work discontinued in many plants, to indicate some slowup in the snappy sales pace. But production still is high and is likely to stay that way until the labor situation is resolved.





1954	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Mar.	206	188	200	180	210
Apr.	206	188	200	180	211
May	207	189	201	181	211
June	208	189	201	182	212
July	211	189	201	182	212
Aug.	210	190	201	181	213
Sept.	214	191	203	182	215
Oct.	212	192	203	183	215
Nov.	214	193	203	183	218
Dec.	214	194	204	184	219
1955					
Jan.	215	195	204	185	219
Feb.	216	195	204	185	220
Mar.*	217	195	205	185	222

*Preliminary.
U. S. Bureau of Labor Statistics.

	New Orders*		Sales*	
	1955	1954	1955	1954
Jan.	12,118	8,475	12,306	11,580
Feb.	12,748	9,629	12,442	11,278
Mar.	.....	10,206	.....	11,385
Apr.	.....	10,021	.....	11,502
May	.....	10,060	.....	11,344
June	.....	9,985	.....	11,395
July	.....	9,700	.....	11,287
Aug.	.....	9,978	.....	10,952
Sept.	.....	11,699	.....	10,933
Oct.	.....	11,478	.....	10,664
Nov.	.....	11,521	.....	11,569
Dec.	.....	12,284	.....	12,026

*Seasonally adjusted. U. S. Office of Business Economics.

Truck builders are paralleling gains of passenger car producers. Truck output during April was best in two years, and is scheduled for the same rate in May, according to *Ward's Automotive Reports*. June also is likely to be a good month.

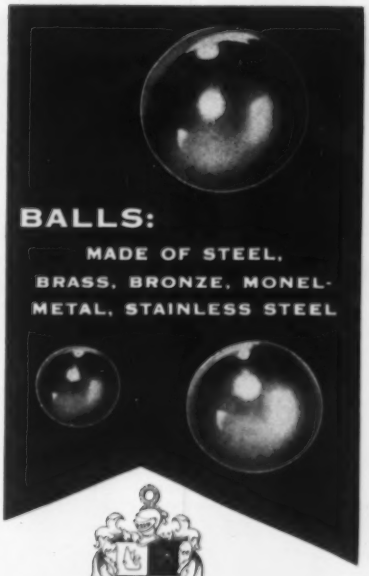
New construction outlays rose in April to a new high for the month of $3.2 billion, the Labor and Commerce departments report. That means spending is at a seasonally adjusted annual rate of $41.7 billion, compared with 1954's record of $37.3 billion.

There were new highs for home building, commercial buildings, public utilities and highways. Industrial building remained encouragingly steady, instead of showing an April decline as in recent years.

The continuing high level of contract letting seemingly assures another banner year for building.

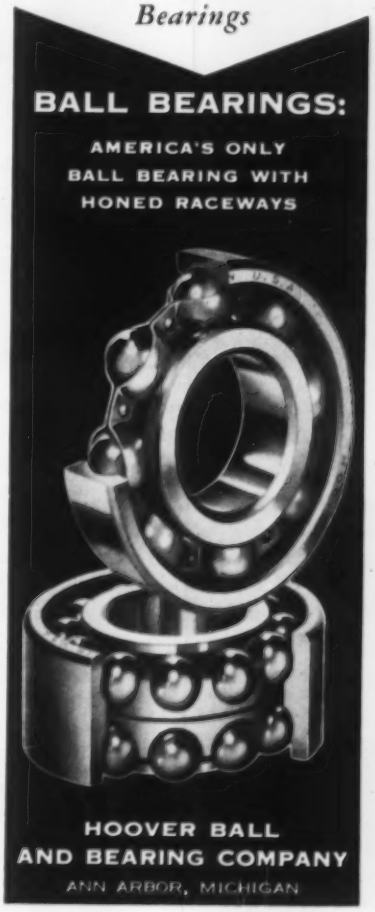
Trends Fore and Aft . . .

First-quarter sales and earnings of Robertshaw-Fulton Controls Co. are up from a year ago. John A. Robertshaw, president, says the current high volume of industrial activity and home building should be reflected in a continued high level of operations for the company . . . National Malleable & Steel Castings Co. foresees a seasonal decline in the third quarter but the possibility of a more pronounced fourth-quarter recovery than was looked for a few months ago, notes Cleve H. Pomeroy, president . . . Prospects for the remainder of 1955 appear to be good, remarks E. C. Bullard, president, Bullard Co. . . . Both sales and earnings of Vanadium Corp. of America in the first quarter were largest for such a period in the company's history, reports W. C. Keeley, president. "The improvement is due largely to increased demand for our ferroalloys, as a result of increased production of steel and aluminum; this year should prove the best ever for the company" . . . A substantial upturn in excavating and drilling equipment (that began in March and has continued) is expected to result in second quarter earnings being higher than those of first quarter, '55 and second quarter, '54, reports Bucyrus-Erie Co. . . . Indications are that earnings of Pullman Inc. will improve in the second quarter and continue that way in the second half, predicts Champ Carry, president.



HOOVER

The Aristocrat of Bearings



This one SPEED NUT for either screw

provides new savings!

If you use "A" and "Z" sheet metal screws in your product assemblies, here's good news for everyone from your design and production engineers to stock room clerks.

C7000 Flat Type SPEED NUTS work equally well on both "A" and "Z" sheet metal screws—only one type of SPEED NUT brand fastener to purchase, stock and handle. You reduce inventories, eliminate parts mixing. And you can also lower unit costs through larger quantity purchases.

One SPEED NUT replaces three parts . . . lock washer, threaded nut and spanner washer. Yet it offers an attachment that is permanently tight until you want to loosen it!

Ask your Tinnerman representative for samples of the new dual-service C7000 Flat Type SPEED NUT . . . it's the modern way to save time and money, and avoid headaches!

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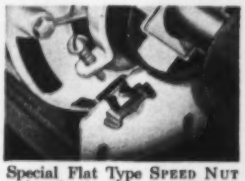
TINNERMAN **Speed Nuts**®

FASTEST THING IN FASTENINGS®

TYPICAL USES

Flat Type SPEED NUTS cut costs of attaching auto radio speaker to baffle.

Air-conditioner control-panel assembly costs cut 40% with help of Flat Type SPEED NUTS.



Special Flat Type SPEED NUT reduced assembly time 87% on washer motor mount bracket.

More than 8000 shapes and sizes

JOSEPH H. CANNON
. . . Clifford-Jacobs Forging president

ROLLIN M. BEUTEL
. . . Paterson-Leitch president

DR. IRVING A. OEHLER
. . . American Welding mfg. manager

Joseph H. Cannon was elected president, **Clifford-Jacobs Forging Co.**, Champaign, Ill., to succeed **W. E. C. Clifford,** founder and president, who becomes chairman of the board. **F. H. Bachman** succeeds Mr. Cannon as executive vice president and continues as secretary-treasurer.

William A. Steele was elected vice president - operations, **Wheeling Steel Corp.**, Wheeling, W. Va. **Albert H. Shonkwiler** was made general manager of the Steubenville, O., Works; and **W. H. Holman,** assistant general manager.

John D. Thompson was elected president, **Henry Disston & Sons Inc.,** Philadelphia. He was executive vice president. **Jacob S. Disston Jr.,** president since 1947, was elected chairman of the board to succeed his cousin, **S. Horace Disston,** who continues a director.

With acquisition of **Mackintosh-Hemphill Co.**, Pittsburgh, as a division of **E. W. Bliss Co.**, Canton, O., **Col. J. S. Ervin,** former Mackintosh-Hemphill president, becomes a director of Bliss and a member of its executive committee. **J. R. Patterson,** Mackintosh vice president-sales, is now a vice president of Bliss in charge of the new division. **C. H. Paul,** Mackintosh vice president-treasurer, is assistant treasurer of Bliss.

Rollin M. Beutel was elected president, **Paterson-Leitch Co.**, Cleveland, and **W. J. Shenk** was made chairman of the board. They succeed, respectively, **R. I. Leitch** and **C. J. Paterson,** founders of the company, who now serve as members of the executive committee. **T. H. Paterson** was named vice president to succeed Mr. Shenk. **W. J. Shenk Jr.,** who succeeds Mr. Beutel as secretary, also was made a director.

George L. Berry was named chief engineer of **Jones & Laughlin Steel Corp.**, Pittsburgh. He was manager of the plant and production engineering department, steel division, of Ford Motor Co.

Chris H. Bartlett and **Charles C. Shutt** were elected vice presidents of **Westinghouse Electric Corp.** Mr. Bartlett heads the manufacturing and repair division, Pittsburgh; Mr. Shutt the small motor division, Lima, O.

Benjamin Z. Ranan was made general manager of **Great Lakes Stamping & Mfg. Co.**, Toledo, O.

C. O. Bartlett & Snow Co., Cleveland, appointed **Norman R. Kidd** manager of its service and parts sales division.

Albert Tintner joined **Amthor Testing Instrument Co.**, Brooklyn, N. Y., as general sales manger.

Dr. Irving A. Oehler was made manager of manufacturing, **American Welding & Mfg. Co.**, Warren, O. With the company since 1942, he was made administrative assistant to the president last January.

American Brake Shoe Co. elected **Harry C. Platt** president of its Engineered Castings Division, Rochester, N. Y. In its Brake Shoe & Castings Division, New York, **Fred Biggs** was made division chairman; **Stephen S. Conway,** division president and chief executive officer; and **John F. Ducey Jr.,** sales vice president. Named to the new post of division vice president-railroad sales is **Sam R. Watkins,** formerly executive vice president of the National Bearing Division.

Ray G. Harrison was made vice president-sales and **T. A. Reeves,** assistant sales manager of **Reeves Steel & Mfg. Co.**, Dover, O.

James F. Magin, vice president and a director of **Square D Co.**, was appointed general manager of the firm's industrial controller division at Milwaukee.

Cyrus N. Johns, president, **American Chain & Cable Co. Inc.**, Bridgeport, Conn., was elected chief executive officer to succeed **Wilmot F. Wheeler,** who continues as chairman of the board. **Wilmot F. Wheeler Jr.** was elected a vice

J. DOUGLAS JAMES
. . . Urick Foundry v. p.-gen. mgr.

H. M. DARDANI
. . . Miniature Precision Bearings v. p.

JOSEPH V. DELANEY
. . . Lodge & Shipley v. p.

president. **Arthur C. Laske** (continuing as secretary) succeeds **Stanley Mann**, retired, as treasurer.

J. Douglas James was elected vice president-general manager, **Urick Foundry Co.**, Erie, Pa. Other appointments: **Harold C. Talling**, sales manager; **James O. Smith**, foundry superintendent; **Howard F. Freed**, sales service engineer; and **Harold C. Boden**, production manager.

George R. Weppler joins **Harvey Hubbell Inc.**, Bridgeport, Conn., as vice president and assistant general manager. He was vice president-operations at Waterman Pen Co.

Lawrence R. Greenhaus was promoted from sales representative to New York district manager of **Luria Engineering Co.**

Burnell L. Verner and **J. L. Gordon** were elected vice presidents, **Luria Bros. & Co. Inc.**, Philadelphia. Mr. Verner is Pittsburgh manager; Mr. Gordon, St. Louis manager.

Northrop Aircraft Inc., Hawthorne, Calif., named **Ray Gayner** vice president - manufacturing; **George Douglas** assistant chief engineer; and **T. V. Jones** head of development planning.

Milton T. Schimmel was made general manager and **Gerald D. Minnick** plant superintendent of **Conforming Matrix Corp.**, Toledo, O.

Miniature Precision Bearings Inc., Keene, N. H., elected **H. M. Dardani** vice president-manufacturing. Formerly chief process engineer, he now co-ordinates activities of the engineering and manufacturing departments. **R. H. Carter** was made chief engineer; **R. H. Gengenbach**, manufacturing superintendent.

John A. Wettergreen, general works manager, was elected vice president-manufacturing at **Bucyrus-Erie Co.**, Milwaukee.

C. G. McGlynn was made purchasing agent and **R. L. Franz** assistant purchasing agent of **Aluminum Goods Mfg. Co.**, Manitowoc, Wis. Mr. McGlynn succeeds the late **E. W. Hall.**

Follansbee Steel Corp., Follansbee, W. Va., appointed **Alfred R. Florio** general manager of its sheet metal specialty division. Mr. Florio also is vice president of Louis Berkman Co., Steubenville, O.

At Food Machinery & Chemical Corp.'s **Peerless Pump Division**, Los Angeles, **Carl L. Nickel** was made product sales manager, water systems and dealer line products; and **Norman C. Olson**, product sales manager, engineered line products.

Brainard Steel Division, Sharon Steel Corp., named **Jack V. Donner** eastern regional sales manager for steel strapping sales, with headquarters in Cleveland; and **Earl J. Goetz**, midwestern regional sales manager, Chicago.

Lodge & Shipley Co., Cincinnati, appointed **Joseph V. Delaney** vice president. He continues as director of the company and general manager of the Hamilton Division.

Webster-Chicago Corp., Chicago, elected **Edward R. Johnson** vice president-treasurer; **H. R. Letzter**, vice president-general sales manager; **Walter Hermann**, vice president and director of operations; **H. D. Von Jenef**, vice president-general manager, government division; **E. J. Moritz**, vice president-general manager, laminations division; and **C. S. Castle**, vice president-eastern division manager.

Frank S. Brewster joined **Brumley-Donaldson Co.**, Los Angeles, as foundry consultant.

S. B. Knutson was named plant manager in charge of production at **Kidd Drawn Steel Co.**, Aliquippa, Pa. He was superintendent of the Flex Steel Division of National Electric Products Corp. **T. S. Palmquist** was made director of engineering and development. **Alexander H. Gaal**, a former vice president of Earle M. Jorgenson Co., was made sales representative to cover California, Arizona and Nevada, with headquarters at Pasadena, Calif. **Robert H. Cremere** covers the Pacific Northwest, with headquarters at Portland, Oreg.

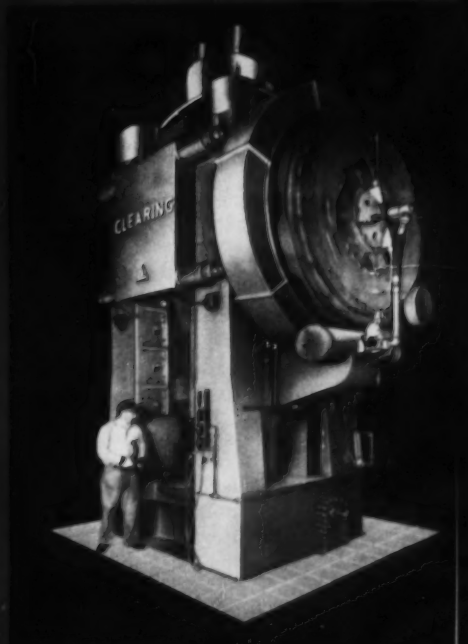
Merritt L. Smith was made executive advisor of **Metal & Thermit Corp.**, New York, to assist the

Take a Tip from This Forging Job

To meet the urgency of military requirements, the forgings industry took giant strides in developing blades and buckets for jet engines.

The steels used in these forged parts are extremely tough titanium alloys. Shape of the part is unusually complex and difficult to machine. By working out methods to press forge these parts, the forging industry was able to mass produce them to tolerances that all but eliminate machining and economize on the expensive material, too.

There are many parts like this one which can be produced with much greater economy. This may be true about some parts that you are making. We'd like to send an engineer who can talk your language and share your problems. There'll be no obligation.



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president in the sales activities.

A. J. Jarreau was made manager of the sales department of **Barden Corp.**, Danbury, Conn.

M. J. Ross was named manager, export trade, for both the Quaker Rubber Corp. and the Watson-Stillman Co. Divisions of **H. K. Porter Company Inc.**, New York.

Arthur E. Maha becomes sales manager of **Link-Belt Co.'s** Dodge plant in Indianapolis to succeed the late **G. Harold Woody.**

K. Leslie Morgan resigned as director of purchases and traffic at Le Roi Division, Westinghouse Air Brake Co., to organize the **Ken Morgan Sales Co.** at Milwaukee, to service engine, automotive and construction machinery industries.

Richard C. Crouch was elected president and treasurer, **Acme Aluminum Alloys Inc.**, Dayton, O. He succeeds **B. D. Claffey** who resigned the presidency a year ago.

North American Refractories Co., Cleveland, elected **H. E. Stuhler** president; **E. W. Valensi**, first vice president and treasurer; **Joseph A. Stott**, sales manager; and **Sue P. Pejeau**, secretary.

H. L. Guthrie was made assistant director-purchases, **American Bridge Division**, U. S. Steel Corp., Pittsburgh.

Frank L. Sonneman replaces **Robert J. Sheridan**, retired, as division manager of **Triplex Screw Co.**, Cleveland, division of Murray Corp. of America.

Herbert S. Hersey, president of C. O. Bartlett & Snow Co., Cleveland, was elected president of **Grindle Corp.**, Harvey, Ill. He succeeds the late **A. J. Grindle.**

C. A. BRASHARES

A. BRENT WILSON

. . . vice presidents of Harbison-Walker Refractories

Harbison-Walker Refractories Co., Pittsburgh, elected **C. A. Brashares** vice president-sales and **A. Brent Wilson** vice president-subsidiaries. Mr. Brashares was general sales manager. Mr. Wilson served as assistant to the president. A newly elected director is **W. C. Robinson Jr.**, president of National Electric Products Corp.

John A. Donnelly was made general manager, **American Steel & Alloys Corp.**, Hartford, Conn.

Andrew M. Mras was elected executive vice president, **American Metal Products Co.**, Detroit. He continues as treasurer and a director.

In the maintenance and utilities division of **U. S. Steel Corp.'s** Fairless Works, Morrisville, Pa., **Roy L. Leventry Jr.** was made superintendent. He replaces **Kermit L. Johannsen**, now assistant to the vice president-steel operations at Pittsburgh.

F. Leroy Hill, president, Hill Machine Co., Rockford, Ill., assumes the chairmanship of **Camdale Inc.**, East Detroit, Mich.

Chester Bland was elected president, **Colt's Mfg. Co.**, Hartford, Conn., to succeed **B. F. Conner**, resigned.

Frank J. Kearns, vice president-engineering, **Bridgeport Brass Co.**, Bridgeport, Conn., fills the newly created post of vice president-manufacturing.

Howard C. Liebing was made sales manager of **National Tool Co.**, Cleveland. He was production control manager.

F. R. Brugler was elected comptroller, **Bethlehem Steel Co.**, Bethlehem, Pa., to succeed the late **R. H. Schlottman.**

OBITUARIES...

John M. Cook, 60, vice president-general sales manager, **Behr-Manning Division**, Norton Co., Troy, N. Y., and a director of both companies, died Apr. 14.

F. J. Peters, vice president, **National Automatic Tool Co.**, Richmond, Ind., died recently.

Everett F. Merrill, president and treasurer of **Merrill & Usher Co.** and **Merrill Aluminum Co.**, Worcester, Mass., died Apr. 26.

John P. Mudd, 67, public relations director for **Midvale Co.**, Philadelphia, died May 1.

John P. Breuer, 68, hob engineer, **Barber-Colman Co.**, Rockford, Ill., died Apr. 20.

Morgan D. Douglas, 63, retired vice president of **General Motors Corp.**, Detroit, and general manager of its GMC Truck & Coach Division from 1945 to 1949, died May 3.

Frank W. Vosmer, 68, vice president, **Union Iron & Steel Co.**, Cincinnati, died Apr. 26.

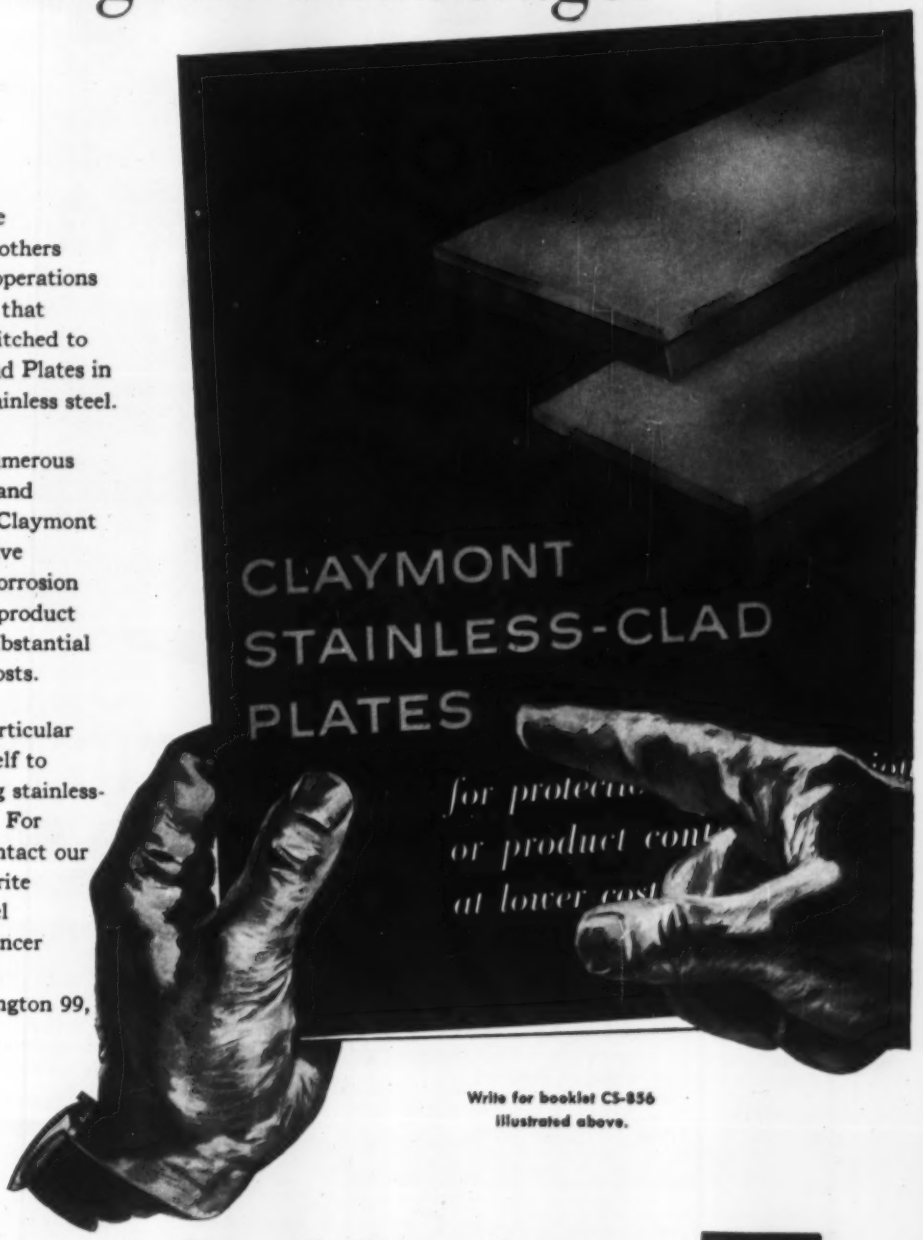
Quincy Bent, 75, a retired vice president of **Bethlehem Steel Co.**, Bethlehem, Pa., and former director of Bethlehem Steel Corp., died May 5. He had been in charge of steel division operations.

can I use Claymont Stainless-Clad to good advantage?

Many companies in the chemical industry and others engaged in processing operations have asked themselves that question—and then switched to Claymont Stainless-Clad Plates in place of costly solid stainless steel.

They found that for numerous types of tanks, vessels and processing equipment, Claymont Stainless-Clad Plates give effective resistance to corrosion and protection against product contamination—plus substantial savings in equipment costs.

It may be that your particular processing job lends itself to the use of money-saving stainless-clad. Why not find out. For detailed information contact our nearest sales office or write direct to Claymont Steel Products, Wickwire Spencer Steel Division of CF&I, 813 West Street, Wilmington 99, Delaware.



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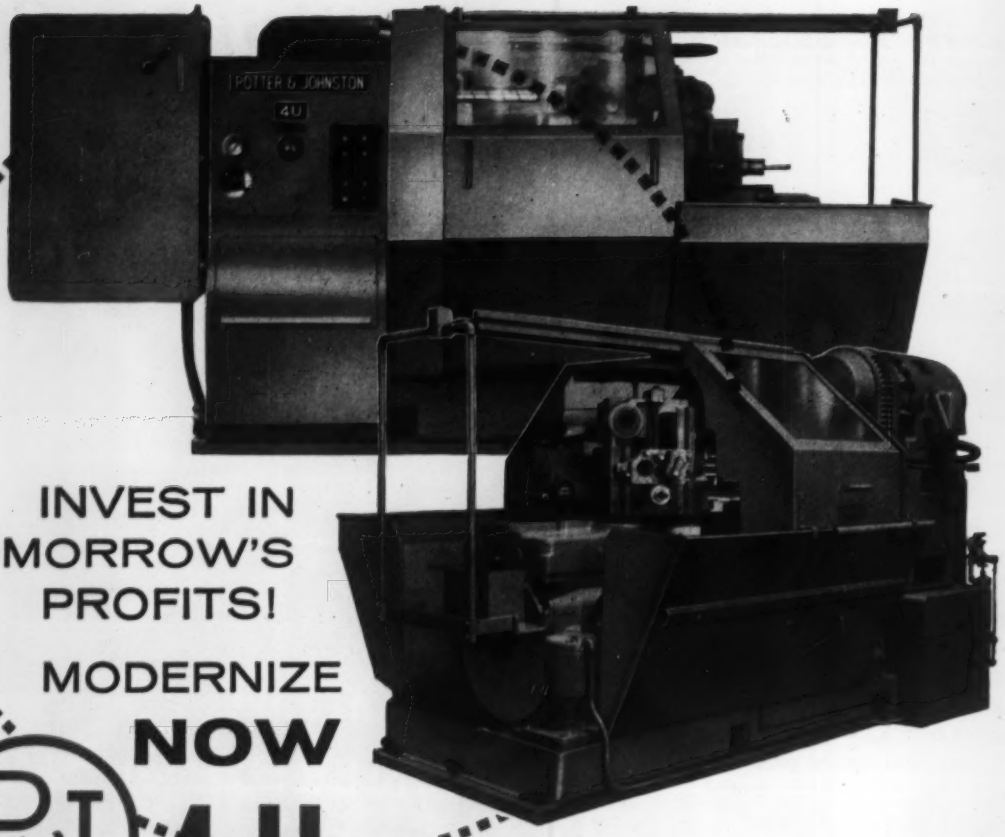

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THE P&J 4-U AUTOMATIC TURRET LATHE

The Potter & Johnston 4-U Automatic Turret Lathe is designed and built SPECIFICALLY to handle today's tough alloys faster and more economically.

Check THESE 4-U PRODUCTION FEATURES

- **EXTRA SPEED and POWER** . . . 25 hp motor with all-clutch drive and spindle speeds to 1177 rpm takes full advantage of faster-cutting carbide tooling. On a recent job, a P&J 4-U consistently removed ***4 pounds of metal in just 30 seconds!***
- **GREATER RIGIDITY** . . . to maintain high precision and eliminate tool chatter under the heaviest cutting conditions.
- **UNUSUAL VERSATILITY** . . . independent front and rear cross slides, overhead pilot for added tool capacity, and many other features . . . plus expertly engineered P&J Tooling . . . means greater profits for a wide variety of work types and sizes.
- **FAST, SIMPLE SET-UP** . . . because *all* machine functions are controlled from a conveniently located, extra large dog drum.

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SEE US AT BOOTH 1219

PRECISION PRODUCTION TOOLING P&J FOR MORE THAN FIFTY YEARS

Launches Expansion Plan

United Engineering & Foundry will spend $9 million to modernize and improve facilities

A MODERNIZATION and improvement program, involving about $9 million to be spent over the next two years, is being launched by United Engineering & Foundry Co., Pittsburgh. All plants will participate.

The company's main products are rolls, rolling mills and auxiliary equipment, shearing and heavy special machinery, machine tools, forging presses, castings, weldments and electrolytic lines.

Advances in the design and efficiency of tools, the need for increased capacity and confidence in the future are the determining factors in expediting the program, says Geoffrey G. Beard, president.

Financing will be done through a 10-year bank loan. The action follows approval by stockholders to increase indebtedness to $15 million.

Master Electric Expanding

Master Electric Co. will erect a $300,000 addition to its plant in Dayton, O. To house the firm's punch press operations, it will be ready for occupancy late in the fall.

Opens Los Angeles Warehouse

Bridgeport Brass Co., Bridgeport, Conn., opened a warehouse for brass and copper mill products at 6500 E. Flotila St., Los Angeles, Calif.

Burton Mfg. Enlarges Plant

Burton Mfg. Co. is constructing a 38,000-sq-ft plant in Santa Monica, Calif. Production of machine tools and surgical supplies will be stepped up.

Scaife To Make Heating Units

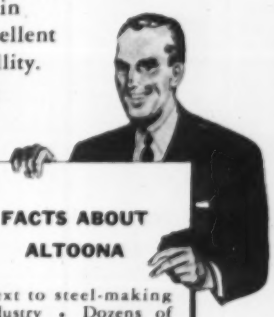
Scaife Co., Pittsburgh, has moved into the consumer product field with the purchase of the Timken-Silent Automatic Division of Rockwell Spring & Axle Co. This division, which has its main office

(*Please turn to page* 94)

...to help you finance your new plant

Why put your money in bricks and mortar? Altoona Enterprises, Inc., an experienced community agency, has a non-profit *million dollar* fund to help you obtain desirable new factory space on a lease or sale basis. Take advantage. Get your new plant at *non-profit* rental or amortization!

Surplus of Skilled Labor—Altoona offers you 8,000 men and 3,000 women trained in mechanical skills and boasting an excellent record of efficiency and labor tranquillity. One metal firm, recently located here, had 4,000 applications for 100 jobs!



Mainline Transportation—Altoona is right on the PRR mainline. Excellent motor trucking facilities are available. The famous Pennsylvania Turnpike is just thirty miles away!

Write Dept. S-5 or phone ALtoona 3-8151 in confidence.

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FLEXIDYNE

THE DRY FLUID DRIVE

DODGE of Mishawaka Announces An Entirely New Development in Industrial Power Drives that Promises to Revolutionize Drive Performance! Every Design Engineer and Plant Operating Man in America Will Want the Following Information.

Here are the facts on how easily Flexidyne handles difficult starting problems, and gives a *new* kind of protection against shock and overloads.

While new in the United States, this drive has already been proved in thousands of installations in Europe. Dodge has redesigned it to American standards and now makes its dramatic advantages available to all industry.

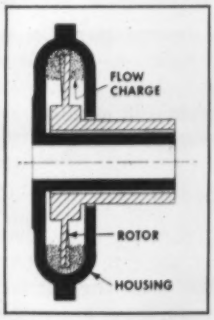
Flexidyne is a *dry fluid drive*. Its advantages over any other fluid-type drive are based on the fact that at normal operating conditions it *does not slip*.

WHAT IT IS

The Flexidyne Drive is made up of a housing, inside of which a rotor is free to turn concentrically. Between the two are fine particles of spherical steel shot, called the "flow charge," which acts very much like a fluid. The flow charge transmits power from housing to rotor.

This flow charge is easy to seal in, has a high density and can stand relatively high temperatures. The use of this flow charge makes possible a design that is simple, compact, economical, and gives outstanding new and different operating characteristics.

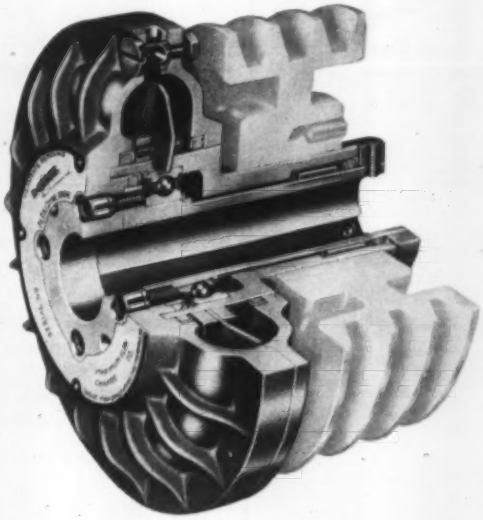
HOW IT WORKS



1. The motor is connected to the housing, and starts it turning at no load.

2. The flow charge is thrown to the circumference of the housing, is compressed by centrifugal force, and revolves with the housing.

3. The rotor, connected to the load, is started and accelerated by the friction and wedging action of the revolving flow charge.



FLEXIDYNE DRIVE (with Taper-Lock Sheave in phantom).

4. Rotor and housing reach identical speeds—the Flexidyne operates with ZERO SLIPPAGE between motor and load at normal running speeds.

5. Before overloads cause damage, the Flexidyne rotor slips relative to the housing, overcoming the friction and wedging action of the flow charge. A thermal switch (optional) automatically cuts the electrical circuit if an overload persists.

6. The amount of the flow charge determines the torque capacity.

WHAT IT DOES

The Flexidyne gives you the *exact* starting torque you need, for anything from the smoothest to the fastest start. Once the load reaches normal speed, there is zero slip, giving 100% efficiency. Also, it provides *accurate* overload protection, as it can be set to slip at any desired load. During starting and overload periods the current draw is at a minimum because with the standard Flexidyne setting the motor is never pulled down to less than 90% of synchronous speed.

All this is due to Flexidyne's completely new principle, which produces *constant torque* for a given input speed, regardless of the percentage of slip between the rotor and housing (which occurs only during starting or overload).

The Flexidyne is simple to select *off the shelf*. Each size has a standard horsepower rating and yet it is only a matter of minutes to vary the flow charge to give you your own *tailor-made torque* to suit the job.

With Flexidyne you get *uniform* performance regardless of changes in the surrounding temperature.

The Flexidyne has very long life and practically negligible maintenance. *Its simplicity guarantees its dependability.* Gas and diesel engines also benefit from all Flexidyne advantages.

Aside from Flexidyne's low first cost, low maintenance, and top efficiency, it permits the use of smaller, cheaper motors and controls with greatly reduced current demands and improved power factor. Its *smoother* starts and *gentler* overload protection avoid breakage and reduce maintenance on drives, gears, bearings and driven machinery.

FLEXIDYNE COUPLINGS

Two lines will be available—*Flexidyne Drives*, for convenient mounting directly on motor shafts and adapted for Dodge Taper-Lock Sheaves, and *Flexidyne Couplings* with Taper-Lock Bushings, for straight line drives. Several thousands of these units of French design, in capacities ranging from fractional to thousands of horsepower, are now in use in Europe. Dodge will first offer — from stock — four sizes rated at 3 to 30 hp at 1800 rpm. Other sizes will follow.

Write now for special bulletin, delivery dates and application information.

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CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

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Made of highest standards and uniform quality thus insuring maximum service.

Since 1903

Large inventory of stock sizes of round punches and dies—also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

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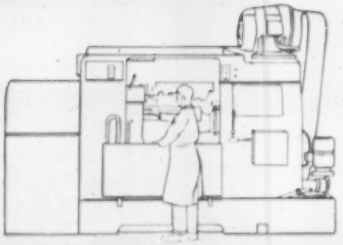
A qualified Simmons rebuilding engineer will discuss it with you. Write, wire or phone today. Simmons Machine Tool Corporation, 1755 North Broadway, Albany 1, N. Y.



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SIMMONS GIVES MACHINE TOOLS A NEW LEASE ON LIFE

Unconditional guarantee... our standard since 1910

(*Concluded from page* 91)

and plant facilities at Jackson, Mich., is a manufacturer of domestic central heating equipment. Scaife Co., primarily a metal fabricator of pressure vessels, has a plant at Oakmont, Pa.

Kent, O., Firms Merge

Twin Coach Co. is purchasing all the outstanding stock of Davey Compressor Co., both of Kent, O. The Davey firm makes portable and industrial air compressors, truck power take-offs, pneumatic tools and rotary drill rigs.

Producto Opens New Facility

Producto Machine Co., Bridgeport, Conn., with Bossert Co., Kansas City, Mo., is opening an assembly warehouse at 17th and Main Sts., the latter city. A complete line of Producto die sets, diemakers' accessories and toolroom equipment will be included in the assembly operation.

Garrett Enlarging Plant

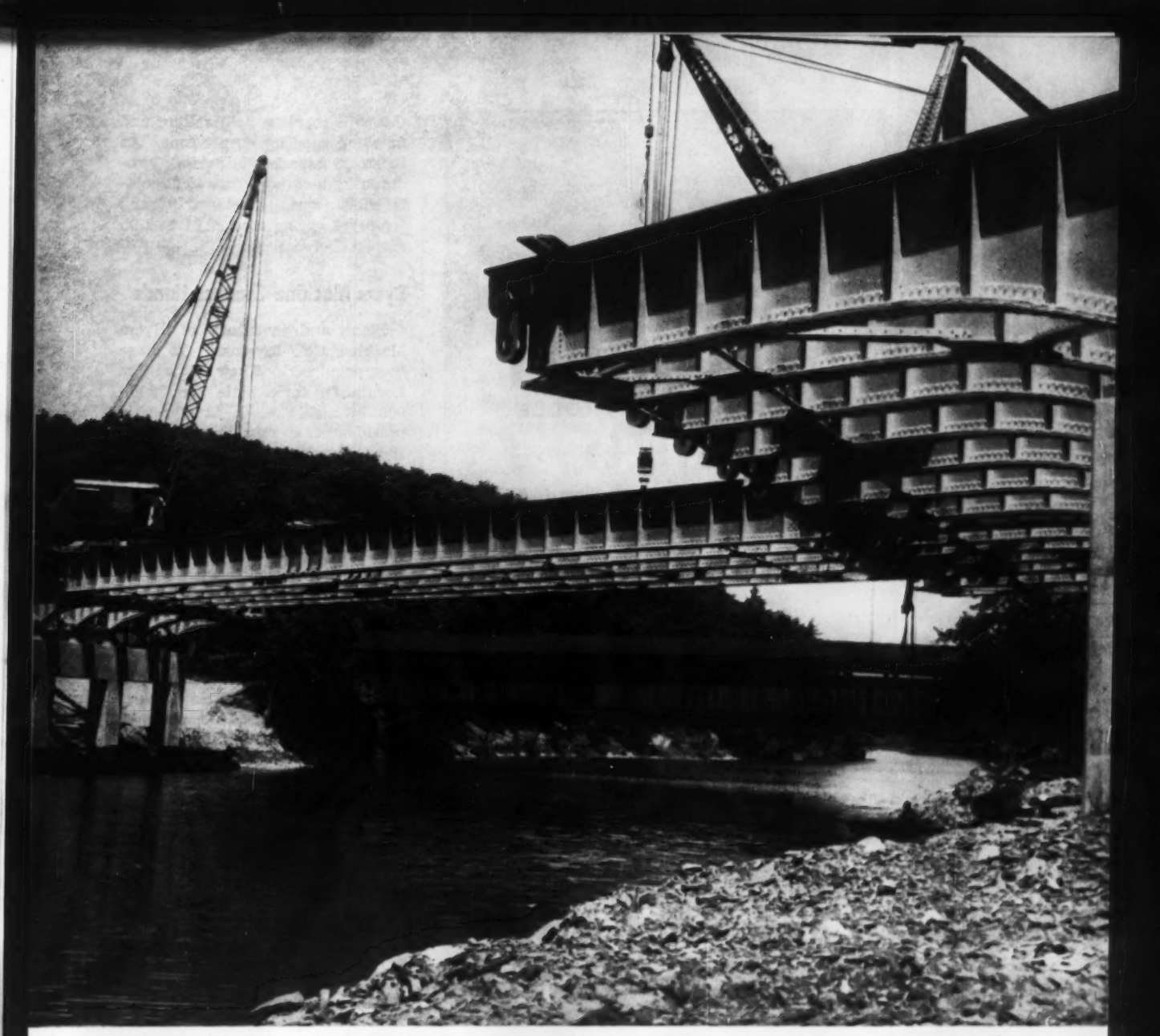
Garrett Corp., Los Angeles, is erecting a $1.3 million administration and engineering office building, an extensive addition to its present AiResearch Mfg. Division plant. AiResearch makes aircraft accessories and components.

Dreis & Krump Builds Plant

Dreis & Krump Mfg. Co., Chicago, completed construction of building No. 3. Containing 40,000 sq ft, it adjoins other company buildings. It is equipped to handle the welding, frame machining and production-line assembly of the firm's smaller press brakes and presses of 11 to 150-ton capacities. The company makes many larger models.

Bristol, Conn., Firm Expands

Deliveries will be completed this year on $1,850,000 worth of equipment purchased by Associated Spring Corp., Bristol, Conn., for its various plants. Part of it is in operation. Installation of a Sendzimir, reversing, cold-rolling mill at Bristol will be completed this year; with auxiliary equipment,



CROSSING THE WALLKILL at New Paltz, N. Y. are the new and the old in U. S. bridge-building. Foreground: N. Y. State Thruway bridge erected by Phoenix Bridge Co. is 356 ft. long, 107 ft. wide, weighs 1778 tons. General contractor: Corbetta Construction Company, Inc. In distance is Perrine's Bridge built in 1850.

Three-handed bridge

The sign on this New York Thruway bridge says "Phoenix"—but the structure is actually the product of three Barium companies.

Steel plate came from Central Iron and Steel Company; structural members from Phoenix Iron & Steel Company; while fabrication and erection were done by Phoenix Bridge Company, live-wire veteran of 91 years in the bridge-building business. Tie that for a smooth-running, integrated operation.

Bridge-building is only one field where Barium delivers the goods faster. Reason? We can focus the resources of 16 separate companies on the job. And there aren't many jobs the Barium team isn't able to take on. Reason for *that*? Unique diversification—from asphalt barges to magnesium airplanes—plus an alert management intent on keeping Barium a step ahead of the field.

Your copy of the Barium Story, which goes behind the scenes at Barium, is waiting. Just write Barium Steel Corporation, 25 Broad St., New York 4, N.Y. 5.3

16 INTEGRATED COMPANIES

BARIUM

STEEL CORPORATION

WORKING IN STEEL, ALUMINUM, MAGNESIUM, FIBERGLASS

Steel Producers

Chester Blast Furnace (pig iron) • Central Iron and Steel Company • Phoenix Iron & Steel Co.

Steel Fabricators & Processors

Phoenix Bridge Co. • Industrial Forge & Steel, Inc. • Globe Forge, Incorporated • Geometric Stamping Co.

Manufacturers of End Products

Clyde Iron Works, Inc. • Erie Bolt and Nut Company • Bayonne Bolt Corp. • Cuyahoga Spring Company • Jacobs Aircraft Engine Co. • Kermath Manufacturing Company • Kermath Limited (Canada) • Wiley Manufacturing Co.

Lightweight Metal and Plastics

East Coast Aeronautics, Inc.

Cut your production costs
3 ways
with
WYCKOFF
QUALITY CONTROLLED
STEELS
Carbon • Alloy • Leaded
1 UNIFORM MAXIMUM PRODUCTION
2 INCREASED MACHINING SPEEDS
3 LONGER TOOL LIFE
COLD FINISHED STEEL
Controlled CARBON and ALLOY
SPECIALISTS IN COLD FINISHED STEELS EXCLUSIVELY
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Works: Ambridge, Pa. • Chicago, Ill. • Newark, N.J. • Putnam, Conn.
WYCKOFF STEEL PRODUCTS—Carbon and Alloy Steels • Turned and Polished Shafting
Turned and Ground Shafting • Wide Flats up to 12"x2". All types of furnace treated Steels

this will increase cold rolling and finishing capacity 50 per cent. At Bristol, Associated Spring produces high-carbon, annealed, cold-finished, spring-steel strip and tempered spring steel, 0.61 to 1.05 carbon.

Byers Machine Changes Hands

Plant and inventory of Byers Machine Co., Ravenna, O., have been acquired by Thew Shovel Co., Lorain, O., for a little over $900,000 in cash. A. C. Lundgren is president of a subsidiary corporation, Byers Machine Inc., which has been formed to operate the Ravenna plant. Other officers: Vice presidents, E. C. Brekelbaum and W. V. Clark; secretary and treasurer, R. W. Gleason; assistant secretary, Brooks Maccracken. W. W. Blauvelt is general manager.

Sulphuric Acid Plant Opened

E. I. du Pont de Nemours & Co.'s Grasselli Chemicals Department has brought into commercial operation the huge sulphuric acid plant at its East Chicago (Ind.) Works. It is capable of turning out more than a trainload of acid a week.

Helipot To Enlarge Facilities

Helipot Corp., South Pasadena, Calif., manufacturer of precision potentiometers and other electronic components, acquired a 15-acre site at Newport Beach, Calif. Additional production facilities will be built.

Warehouse Changes Name

Roth Steel Warehouse Co., 2271 S. Lumber St., Chicago, Ill., changed its name to Riverside Steel Warehouse Corp.

Diversifies Hardware Lines

North & Judd Mfg. Co., New Britain, Conn., purchased the major assets, including the plant, equipment and name, of Wilcox, Crittenden & Co. Inc., Middletown, Conn. The property will be operated as the Wilcox, Crittenden Division. Phelps Ingersoll, president of Wilcox, Crittenden, will continue in charge of the division

USG PRODUCTS IMPROVE STEEL MAKING FROM CHARGE TO FINISHED INGOT

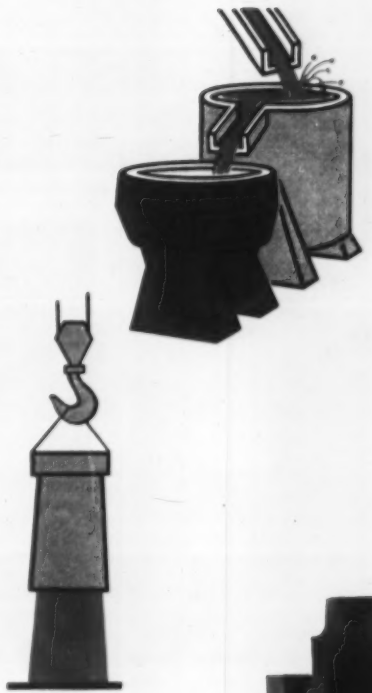
The United States Graphite Company has served the steel industry for a half century with products to improve steel making from the furnace to the finished ingot. Our engineering service and laboratories are constantly working on new products to solve your steel production problems. The products listed here are a few of the most popular and widely used — why not investigate them — they can cut your costs.

RECARB-X®

(engineering bulletin #11)

insures carbon specifications

RECARB-X is ideal for off-carbon heats. A fifty pound bag per 100-tons of steel will raise carbon two points when added to the ladle. RECARB-X dissolves quietly, gives uniform, dependable carbon recovery at all carbon levels. There are grades of RECARB-X for the furnace charge.



MEXICAN® MOLD WASHES

(engineering bulletin #13)

for better ingot surfaces

For as little as ¾c per ingot ton, you can insure quicker, easier mold stripping with MEXICAN Ingot Mold Washes. MEX and 90-B can be applied at any temperature and are easy to prepare and use. Where a high volatile "gas kick" is needed, VOLMEX or XF-81 will supply the answer. For an inert, non-carbonaceous mineral coating, XF-88 will do the job.

MEXATOP®

(engineering bulletin #5)

gives sounder ingots

MEXATOP is a powder compound which spreads easily over molten ingot heads and casting risers. A ⅜" layer over the molten surface works effectively to prevent cavitation and insure sounder castings.

Write for Engineering Bulletins describing these products.

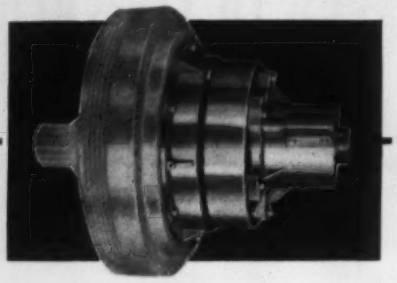
196

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

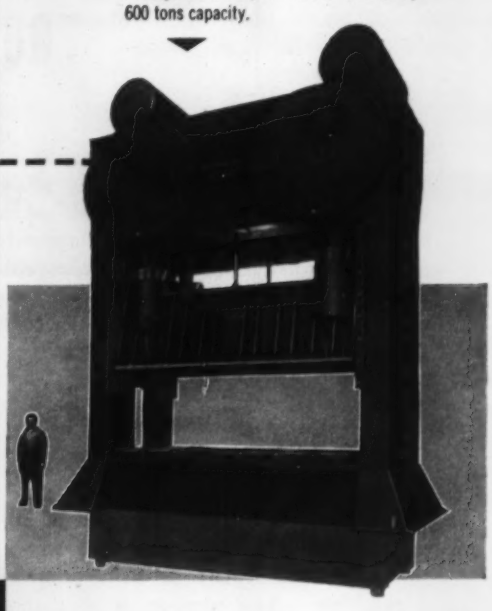
Less Down-Time With CLEVELAND Presses

Powered by the Clutch that's

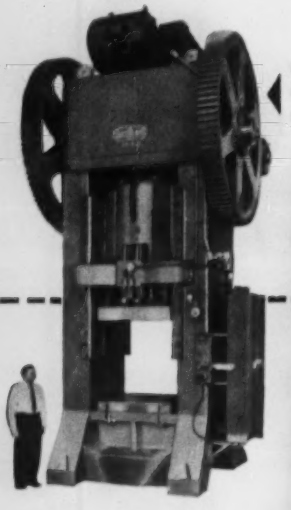


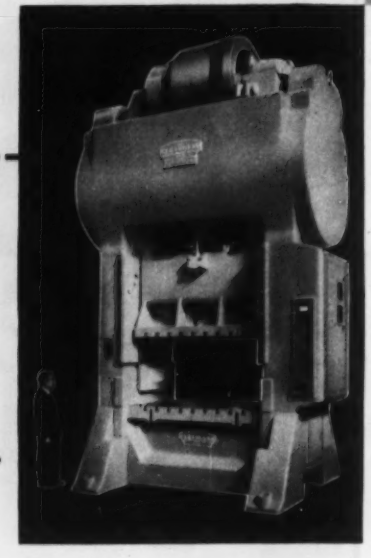
"Revolutionizing" Production

Cleveland S 4-600-204-102 Four Point Press, 40" stroke, 102 x 204" bed area, 600 tons capacity.



Cleveland S 1-800 Single Crank Press double geared, 16" stroke, 48 x 42" bed area, 800 tons capacity.





Cleveland S 2-350-60-42 Double Crank Press, 8" stroke, 42 x 60" bed area, 350 tons capacity.

It doesn't matter which of the 11 types of Cleveland presses best meets your requirements. For as long as it is equipped with our patented Cleveland Clutch, you can be confident that you are getting a press that will give you the best performance obtainable. This proven clutch unit assures minimum down-time, positive, fast control and lower operating costs.

Designed with a minimum number of parts, the patented Cleveland Drum Type Friction Clutch requires only minor adjustments. There is less chance of failure. Its light-weight construction reduces horsepower required for operation. Operational studies prove it to be completely dependable.

Why not investigate the production economy built into every Cleveland Press Equipped with our patented Cleveland Drum Type Clutch. Won't you let us give you the complete Cleveland story? Write or call today!

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CITY FOUNDRY DIVISION • SMALL TOOL DEPARTMENT

which makes boat equipment, hardware, marine lights and marine plumbing fixtures.

ASSOCIATIONS

The Lead Industries Association, New York, elected officers: Andrew Fletcher, St. Joseph Lead Co., New York, president; K. C. Brownell, American Smelting & Refining Co., New York, vice president; J. A. Martino, National Lead Co., New York, vice president, and M. M. Zoller, Eagle-Picher Co., Cincinnati, vice president. Robert L. Ziegfeld was re-elected secretary-treasurer.

The American Zinc Institute, New York, elected the following officers: F. S. Mulock, U. S. Smelting, Refining & Mining Co., Boston, president; C. Merrill Chapin Jr., St. Joseph Lead Co., New York, vice president; R. G. Kenly, New Jersey Zinc Sales Co., New York, vice president. E. H. Snyder, Combined Metals Reduction Co., Salt Lake City, Utah, was named vice president, while Erle V. Daveler, American Zinc, Lead & Smelting Co., St. Louis, was re-elected treasurer. John L. Kimberley was named secretary and Ernest V. Gent was re-elected executive vice president.

The National Fluid Power Association, Evanston, Ill., elected the following officers: President, J. E. Erskine, Racine Hydraulics & Machinery Inc., Racine, Wis.; first vice president, O. Wendell Macy, Hydraulic Power Division, Hydraulic Press Mfg. Co., Mt. Gilead, O.; second vice president, J. J. Pippenger, Double A Products Co., Manchester, Mich. Barrett Rogers is executive secretary.

NEW ADDRESSES

Wilmar Mfg. Co. Inc. moved its offices to 1110-16 Truman Rd., Kansas City 6, Mo.

Correct address of **Ziv Steel & Wire Co.'s** Milwaukee office and warehouse is 2225 S. 38th St. A previous issue incorrectly reported the address.

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Crowded isles and sluggish flow of materials cost you money. So why not go over the top! You can speed production, cut your costs with Conco Cranes, custom designed for your specific needs. Let us show you how. Write for a trained Conco engineer to call and make recommendations, or request bulletin 3000A covering our complete Conco line. Conco Cranes are backed by 37 years of experience.
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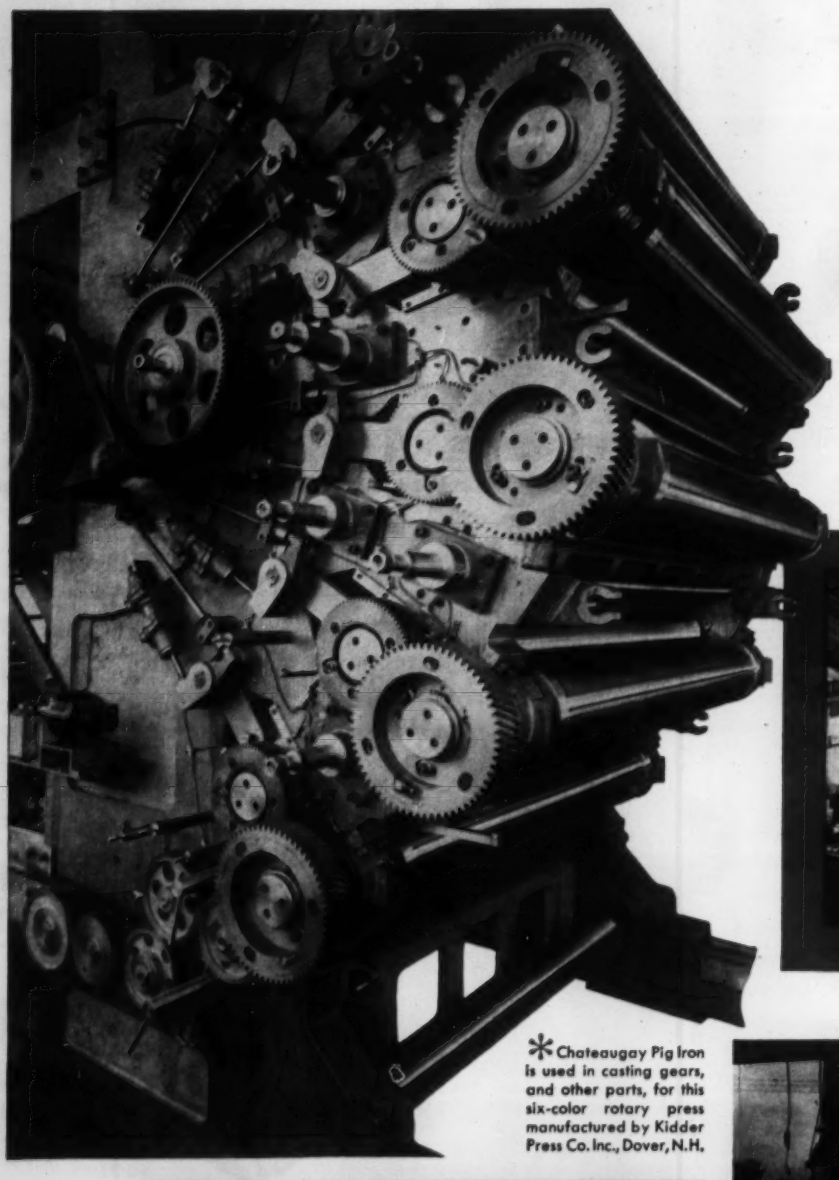
CONCO ENGINEERING WORKS—Domestic Heating Equipment
CONCO BUILDING PRODUCTS, INC.—Brick, Tile, Stone

castings



*Chateaugay Pig Iron is used in casting gears, and other parts, for this six-color rotary press manufactured by Kidder Press Co. Inc., Dover, N.H.

Republic Wedge-Lock Steel Shelving solves the problem of storing castings, patterns and other items. It is specifically designed for high stacking of enormous weights—with no sagging, swaying or buckling. As weight increases, joints get tighter, increasing the stability and rigidity of the entire assembly. You get maximum loading in a minimum of floor space. It's completely flexible, can be assembled quickly and easily.

Republic Chain Slings provide an exceptionally high degree of safety in foundry operations. Republic makes three types, alloy steel, high carbon steel, and wrought iron. A Republic Chain Engineer will tell promptly and impartially which type is best suited to your particular needs. All Republic Chain Slings are proof tested and warranted.

with a fine finish* call for CHATEAUGAY PIG IRON

Kidder multi-color rotary presses for flexographic, rotogravure and letterpress printing are as precise as a fine timepiece. Nothing is spared to meet the known requirements for perfect printing. Only the finest materials are used, including Chateaugay Pig Iron.

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Chateaugay's consistently uniform physicals assure predetermined fine grain structure throughout every casting, regardless of size or shape. It is an exceptionally fluid iron—cools evenly—fills adjoining light and heavy sections completely.

In addition, Chateaugay castings machine beautifully and economically, whether milled, drilled, turned, tapped, ground or threaded.

A Republic Pig Iron Metallurgist will be glad to show you how Chateaugay, the low-phosphorous, copper-free Pig Iron, consistently outperforms other pig irons. There's no cost or obligation. Mail the coupon for prompt action.

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Republic Foundry Flasks speed molding efficiency through ease of operation, ease of handling and through long trouble-free service. Each cope, cheek and drag is welded into one integral piece of steel, ribbed and flanged to provide strength and rigidity. Flasks can be designed and manufactured in various sizes and gages of steel to meet your individual requirements.

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What makes a paint brush bristle?

Mating the handle and bristles of a *good* paint brush is a difficult problem at best. But building a machine to do it automatically is an exercise in higher imagineering. We know, because a well-known paint manufacturer recently brought us this problem.

Taft-Peirce engineers helped to design and build several machines that do the job. Space the bristles in the handle, secure them, trim them, and finish them ready for shipment. The result — a *better, more uniform* product at *lower cost.*

This is just one of the hundreds of different machines and mechanisms conceived and built every year in the Taft-Peirce Contract Division. For a more complete picture of our facilities and experience, send for 92 page illustrated booklet, "Take It To Taft-Peirce."

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TELEPHONE, WOONSOCKET 1

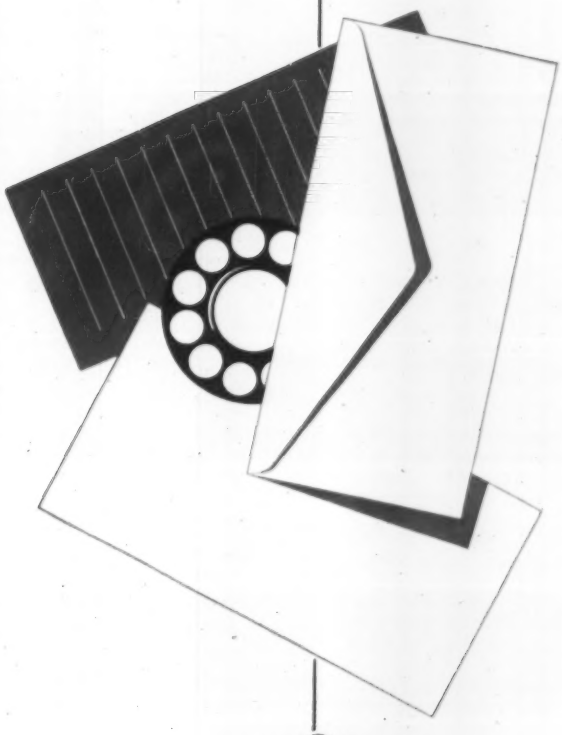
4

STEEL's 1955 Management Series . . .

The editors of STEEL herewith present the fourth in their ten-part series, Program for Management for 1955. The complete list:

1. **Product Promotion** (Feb. 14, p. 73)
2. **Budgeting for Cost-Cutting** (Mar. 14, p. 93)
3. **Plant Layout** (Apr. 18, p. 93)
4. **Communications** (May 16, p. 103)
5. **When To Re-equip** (June 20)
6. **Put Business Trends To Work** (July 18)
7. **Consultants** (Aug. 15)
8. **Purchase Analysis** (Sept. 19)
9. **Market Facts** (Oct. 17)
10. **Keep Your Product Growing** (Nov. 14)

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department,* STEEL, *Penton Bldg., Cleveland 13, O.*



FIVE STEPS TO UNDERSTANDING:

. . . . Clarify the idea or problem
. . . . Get participation
. . . . Transmit ideas and decisions
. . . . Motivate others to act
. . . . Measure the effect

FAILURE IN ANY STEP CAN MAKE COMMUNICATION MISFIRE

Business Communication:

put it on executive-saving time

THE CONFERENCE was badly organized and poorly led. The problem to be solved was not clearly defined. Attention of the conferees wandered. The meeting dragged out.

The executive vice president doodled the salaries of the conference members. His conclusion: "The meeting cost us $360 an hour. It should have taken 30 minutes and cost $180. It took 3 hours, cost $1080."

Talk, Talk, Talk—Conferences, telephone conversations, letters, memos and across-the-desk talks take a big bite out of any industrial executive's day. Still they are essential to the conduct of today's complex business organization.

If communication is effective, the business will run smoothly. If it is not, the enterprise is likely to flounder.

Cost of Failure—Many of management's problems are traceable to communication failures. The production department neglects to inform sales that deliveries cannot be made on schedule. Sales forgets to tell production of demand that will require a change in product mix. A quickie strike is called because a supervisor failed to report a crane operator's dissatisfaction. A department head spends several days writing a 30-page report which is not read because his superior wanted a one-page summary.

The cost of miscommunication is beyond calculation—not only in terms of time and money but in misunderstanding, inefficiency and ill feeling.

Big as Life

The problem of communication in business is as big as all outdoors. It rapidly is gaining recog-

Steps toward more effective conferences

- Provide best physical facilities available. Arrange chairs and tables to enable conferees to face each other. Place visual aids where they can be seen by all. Adjust heating, lighting, ventilation. Supply plenty of ash trays if smoking is permitted. Provide note paper and pencils.
- Establish group parity. In a problem-solving conference, the janitor ranks with the president.
- Get off to an enthusiastic start. The conferences will be easier to maintain. Conferences bogging down at the beginning are difficult to shift into high.
- Define the problem clearly and state the objectives. Obviously, this suggests preliminary work and thought by management.
- Outline procedure. Outlaw glorified bull sessions.
- Encourage participation by all conferees. Draw out those who are timid. Control those who would "hog" the conference.
- Develop the facts surrounding the problem. Again draw on the combined knowledge of conferees.
- Summarize frequently. It helps to record suggestions.
- Seek all possible solutions. Brain storming a problem may reap unexpected rewards.
- Select the best possible solution. Preferably it should be reached by consensus rather than by majority vote.
- Convert the decision into effective action. Nothing is more useless than the right solution that disappears into a filing cabinet or is quietly sabotaged by those charged with putting it into effect.
- Communicate the decision and the method of putting it into effect to all persons affected.

nition as one of industry's major problems.

In the good old days, business enterprises often were managed by one man, generally the owner. He held a tight rein of direction on all aspects of the business, made most of the decisions and delivered them personally to those affected. Communication was a horse-and-buggy problem.

With the development of big business and team management, the communication problem grew in geometrical progression.

Essential to Teamwork—"Satisfactory progress toward our objectives requires an integration of the thoughts and actions of the people involved," says J. L. Atwood, president, North American Aviation Inc. "There are many common names for this integration. It is the co-ordination we speak of in business, and *esprit de corps* in the military; it is just plain teamwork in any human endeavor. No matter what name we use for this happy state of affairs, it obviously cannot be achieved or maintained without communication."

No universally applicable blueprint for effective communication within the management group has been devised. Nor is it likely one ever will be. Companies vary too greatly in size, nature of work, types of personnel, operational problems and objectives.

This does not mean that theories and practices found successful in other companies cannot be adapted to yours. Nor does it mean that the skills of effective communication cannot be learned.

Back to School—In response to demand for more knowledge and skill in communicating in business, the American Management Association this year launched a continuing, three-week course in executive communication. More than 500 business and industrial executives signed up.

The National Industrial Conference Board offers a one-week course in "How To Lead a Conference." It stemmed from the consensus of top management: "Too many meetings are only a waste of time, a rehash of old ideas or monologues by a top executive."

Management recognized the necessity for and value of conferences which pool the knowledge and thinking of a group. It diagnosed the trouble with the poor conference as lack of proper organization and inferior leadership.

Training courses demonstrate that there are certain principles and procedures the leader must know and put into practice.

Recognized, learned and applied, they can provide precision and economy in business communication.

Intangible—The art of communicating is still too little understood. It is so intangible that even the most expert in the field have difficulty in communicating what it is all about. A number of colleges offer seminars and courses in communication. Lecturers by the score are talking about it from platforms. Communication consultants are offering their services. Many companies employ technicians and specialists to set up communication departments.

How can you make sure the

words you use convey the ideas and shades of meaning you intend?

The consensus of metalworking executives interviewed by STEEL is that business communication is and will continue to be one of industry's most difficult problems. They are almost unanimous that communicating is one job that cannot be delegated, but must reside in the executive himself.

Yet they believe communication can be improved substantially by learning and following proved procedures for handling conferences, telephone conversations, letters, memos and directives, informal conversations and other means of conveying information and ideas.

Conferences

They believe conferences can be better organized and conducted to give effect to group dynamics. They believe modern management requires such meetings to draw out the thinking of many minds. They feel such meetings result in decisions being put into effect more efficiently because the people in charge will better understand the whys of the action.

Top-level executives use the conference as one of their most important administrative techniques. Many estimate they spend one-fourth of their workweek "in conference." Their biggest single complaint: "Conferences waste time."

Serve Many Purposes—While the conference usually is considered a means to problem solving or decision making, it actually serves many purposes: 1. To gain awareness of problems that need attention. 2. To obtain better problem solving within the organization. 3. To increase the acceptance of decisions by colleagues, superiors and subordinates. 4. To improve the ability to execute decisions by increasing understanding of the problem and the proposed solution.

"The conference is possibly the most misused and, consequently, the most maligned institution in the business field," believes Mr. Atwood. "There is often some basis for the statement that the best work is done by a three-man committee with two members absent. However, the conference can be an effective management tool if some thought is given to good conference techniques."

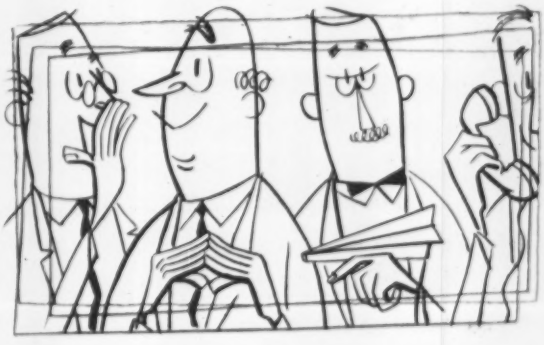
To this end North American circulates to its supervisors a pamphlet on better staff conferences. It urges:

1. Be problem minded; explore the subject thoroughly before forming an opinion.

2. Restate the other man's opinion to his satisfaction before you reply to him.

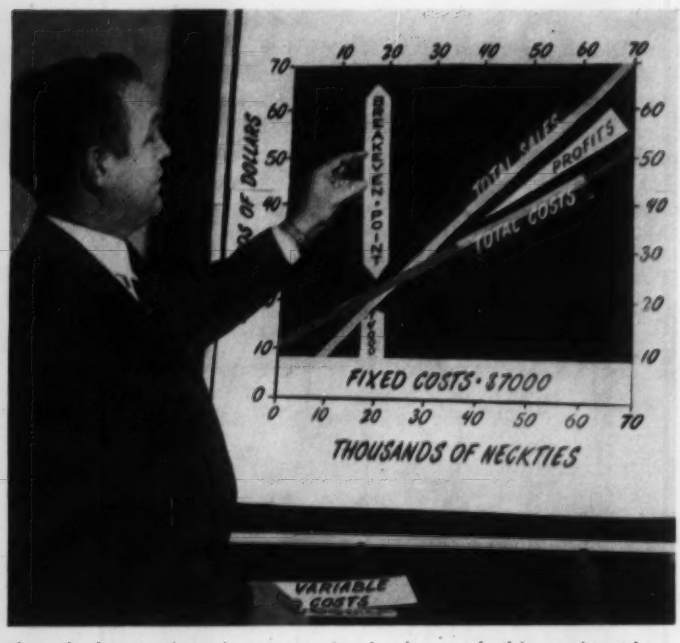
3. Don't allow yourself to get irritated by a word or an idea. Hear the man's whole story.

To these ideas is added the admonition that a conference requires

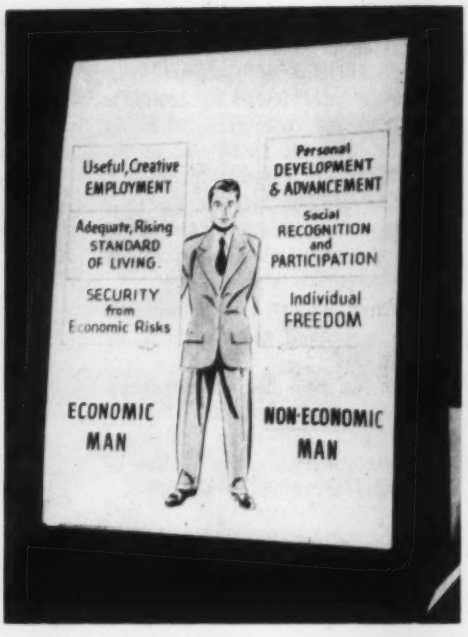


Ten ways to louse up a conference

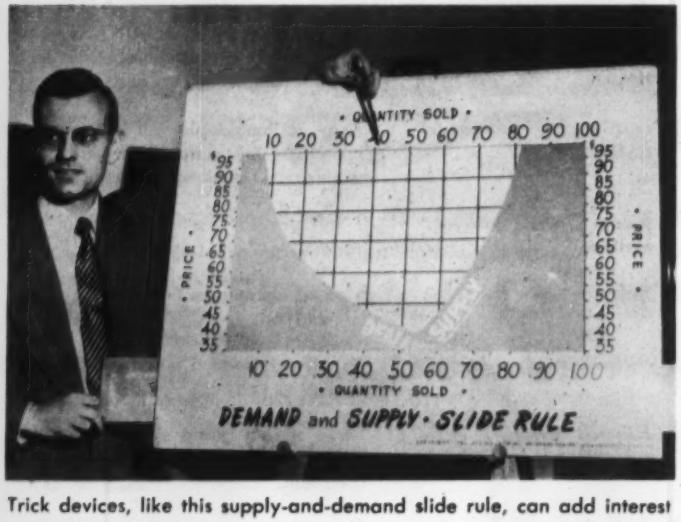
1. Schedule it for "about" a certain time.	That will waste at least 15 minutes. Late-comers will interrupt, will have to be brought up to date.
2. Don't give adequate notice.	Many of the people will be dated up with important customers, will have to skip the meeting.
3. Keep the subject secret.	It will prevent participants from preparing.
4. Set no time limit.	It could encourage the meeting to run on and on.
5. Skip visual aids.	An all-oral session will be more conducive to dozing.
6. Permit sideline conversations.	Three or four going on at once insure failure of meeting, make time wastage complete.
7. Let the leader be unprepared.	The meeting will bog down and everyone may spend 3 hours to accomplish what could have been done in 30 minutes.
8. Let the leader do all the talking.	Nonparticipation insures boredom of other members. Prevents cross fertilization of ideas.
9. Talk solutions first, facts later.	It makes selection of best possible answer unlikely. It enables members with pet nostrums to argue for them without reference to facts.
10. Permit telephone calls to be transferred to the meeting room.	They will interrupt not only the person called but everyone else.



Flannel slap-on board permits the leader to build up his ideas graphically, step by step. Specially adaptable for set presentations



Flipchart with general conclusions prepared in advance helps present ideas more effectively



Trick devices, like this supply-and-demand slide rule, can add interest

Give your ideas eye appeal

Visual aids can make communication in conferences and meetings faster and more effective. Well used, they liven up the proceedings, provide a change of pace and prevent mid-session dozing.

They make the conference leader's presentation simpler. But they require careful preparation.

Projectors for motion pictures and slides usually are available for meetings. Trick devices often are effective in getting over a particular point.

Visual aids shown here are some used by Republic Steel Corp.

intelligent leadership to keep it on the track.

Effective conference leadership can best be learned through practice conferences under skilled direction, says Manley E. Brown, director of training for Lear Inc., Grand Rapids, Mich.

For this reason, many metalworking companies are conducting courses in conference leadership for their supervisors. Often a trained conference leader is called in to conduct the practice session.

Skill in conference leadership also increases effectiveness in conference participation.

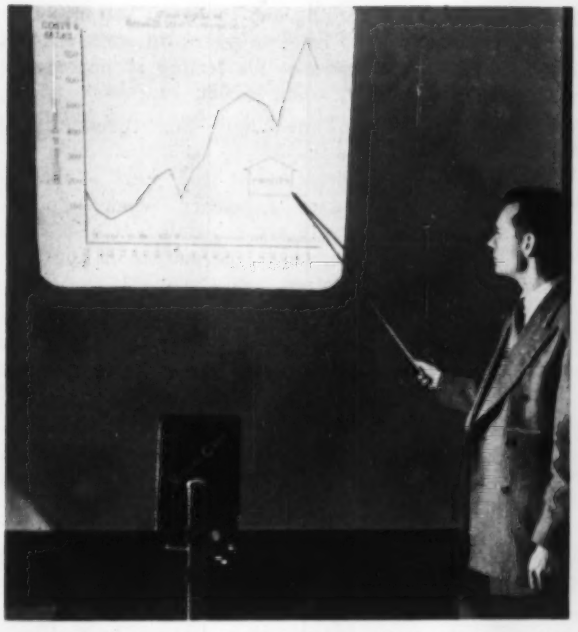
A highly effective course in conference leadership for supervisors was developed by Standard Oil of New Jersey several years ago. The manual used is based on experience gained in training many hundreds of conference leaders and has served as a guide for other companies.

The Telephone

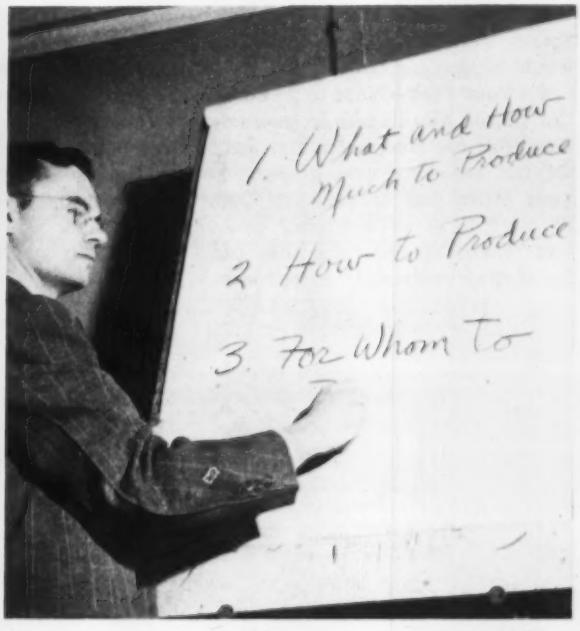
If you think your wife misuses the telephone, check with your own telephone operator. Chances are you will get a liberal education on inefficient telephone usage in your own company.

Simple procedures and tactics can improve (see page 108) telephone communication greatly, plus reduce the time and cost of calls.

A department head in a Cleve-



With a visual cast machine you can block out part of a chart and uncover it piecemeal as the point is developed



Participation is encouraged by the giant pad. A place to record suggestions, it's less messy than the blackboard

land company was called on the carpet when long distance tolls for his division jumped sharply. He asked for and received a breakdown of charges. Many toll charges were $8 to $10. One, to Chicago, cost $12.15 for a 46-minute conversation.

Long-Distance Burping — The man making the high-cost calls insisted he was obtaining information from customers and that a lot of time was required. His superior suggested that he have several calls recorded and analyze them. The long-winded caller played back a lot of aimless conversation and word burps. When he pre-organized his calls, his average toll charge dropped 80 per cent, and he had time to cover many more customers. The men at the other end of the line saved a lot of time, too.

Written Communication

Better organization of letters, memos and directives, plus the application of communication skills, can make a few sentences do the work of several pages of gobbledygook.

Any executive wading through the mass of correspondence he faces daily appreciates the old story of the man who wrote a three-page, single-spaced letter and apologized at the close: "I could have put it all in two paragraphs if I had taken time to organize it."

Minneapolis-Honeywell's Brown Instrument Division recently organized a verbiage pruning class for its letter writers. Since the division sends some 3000 letters daily, besides composing and circulating about 5000 interoffice memos, C. L. Sheetz, training director, estimates inefficient communication is costing the firm hundreds of thousands of dollars yearly.

Stilted on Stilts—Contributing to that inefficiency is the tendency to "write like a man walking on stilts," comments Mr. Sheetz. The company's executives are being taught to organize their thoughts before dictating. Then they learn to talk clearly (without chewing pipe or cigar) and to use simple, clear words and short sentences.

Ben Bennett, editor of Republic Steel Corp.'s management letter, checks his readers frequently to determine what kind and how much information they want. Most frequent advice: "If you use more than a paragraph, we won't read it."

Across-the-Desk

The individual executive probably spends the greatest portion of his communication time in informal, face-to-face conversations. They may be with his equals, superiors, subordinates or people outside the company.

Because such conversations generally are informal, the tendency is to prolong them beyond the time needed to accomplish their purpose. Pointless trivialities intrude.

Leisurely across-the-desk conversations have many benefits. Often, they are exploratory and reveal situations or problems that need attention. They may suggest solutions to problems already recognized.

Morale Builders — Sometimes they are effective in instilling enthusiasm in subordinates for a project or for the organization. They are a means of imparting wider and deeper understanding. They can help weld the management team. Under such circumstances, extending the conversation may be warranted. There is no virtue in brusqueness per se.

The wise executive will want to weigh the benefits of conversation against the time consumed. If all the man-hours wasted in idle con-

versation at any business organization were added up, the total would be staggering.

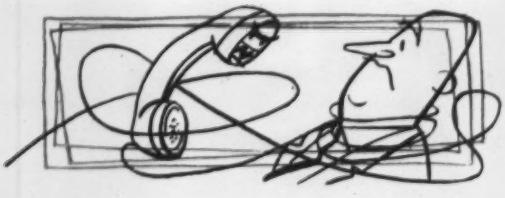
On Your Feet—What to do about the visitor who lingers in your office after his business is finished? Or the associate who drops into your office just to pass the time of day? It is an individual problem. There are no rules that can be applied universally to end nonproductive talking without offending the other party. Executives must develop their own techniques.

One of the most effective is to rise when the conversation has reached its business purpose. That will send the loitering visitor on his way, and, if done casually, will not offend.

You can save time by going to a subordinate's office rather than calling him to yours. The initiative to leave is yours. In addition, you increase his feeling of importance by going to him.

Time Limit—Sometimes it may be feasible to set a limit on a conversation at the start. This becomes necessary when appointments are scheduled. It also helps you cover the subject in the time allotted.

Controlling a conversation remains an individual problem. The most effective way to prevent the inefficient use of time is to adopt a business-like attitude. Be conscious of the value of time.



Telephone tactics

MOST of us have used the telephone since we learned to talk. To suggest that we may be using it improperly seems presumptuous.

But ask any telephone operator. The incorrect or careless use of the telephone results in expensive time wastage, innumerable mistakes, misunderstandings, loss of good will, even business.

To accomplish the aims of the business call—to communicate information, to sell yourself and your company in the least possible time—these practices are recommended:

- Don't say "hello." Identify yourself by name, company and department on both incoming and outgoing calls. If a caller doesn't identify himself, ask him.
- Pre-organize your calls. Be prepared to talk, perhaps with a check list at hand. Get the "ahs," "ers" and other word burps out of your conversation.
- Always be ready to talk when your party answers. You don't ring doorbells and run away.
- Dial your own outgoing calls. It saves time and your secretary won't lose you.
- If you leave your office after placing a long distance call, notify the operator where you can be reached.
- Try to get the same grooming into your voice that you put into your personal appearance. Your voice has to sell your purpose and your personality. Smile with your voice. Imagine your caller is sitting across the desk. Call him by name.
- Get to the point of your conversation. You can't improve the weather by talking about it. The person on the other end of the line has work to do.
- Talk into the telephone in a normal tone, with your lips no more than 1½-in. from the mouthpiece. Keep cigars, pipes, cigarets, gum, pencils out of your mouth. Speak distinctly. Talk at about 120 words a minute.
- Give immediate and undivided attention to information volunteered and the development of facts. Have paper and pencil handy to take notes.
- Let the caller hang up first, if possible. Hang up gently.

Communication's Objectives

While much of the foregoing stresses how to save time in conveying information and ideas, sight should not be lost of the real purpose of communication: To create understanding, obtain co-operation and get action. Many businessmen consider communication as a most important tool for getting things done.

Harold B. Schmidhauser, director of the AMA communication course, says communication may be any exchange of meaning. The AMA course is designed to improve the knowledge of executives concerning communication, to develop an attitude toward its importance and to develop specific skills.

Mr. Schmidhauser and his associates at AMA believe true communication includes the five steps listed at the beginning of this article:

1. Clarify the idea or problem.
2. Get participation.
3. Transmit ideas or decisions.
4. Motivate others to act.
5. Measure the effect.

Clarifying the Idea

"The beginning of all communication is an idea," says Clarence Randall, chairman of Inland Steel Co.

There is no use opening the tap if there is nothing in the tank.

Unless the idea is first clearly formulated in the mind of the transmitter, the message is likely to be misunderstood, says Frank E. Fischer, director of AMA's

management course. "You can't make a clear print from a blurred negative."

The study of communication, continues Mr. Fischer, must begin with a careful and precise identification of the problem. It helps to reduce the problem to a simple statement. As John Dewey said: "A problem well stated is half solved."

The executive's next task is to gather from all available sources data that bear on the problem.

Evaluation—He selects what is important and relevant to the problem and proceeds to examine possible solutions. He examines assumptions, weighs precedents and anticipates consequences. Finally, he chooses what appears to be the best solution and tests its logic and completeness.

Getting Participation

Then he draws others into the problem. He does this primarily for three purposes:

1. To clarify and test his own thinking by sharing his solution with others.

2. To gather the ideas and suggestions of others in a position to contribute to the solution.

3. By inviting their participation, they become enthusiastic and help carry out the decision.

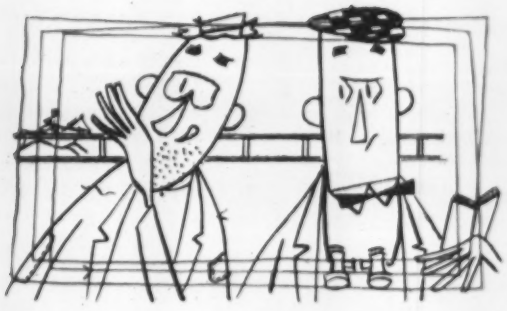
Few problems are so simple, says Mr. Fischer, that an executive's thinking cannot be sharpened by consultation. But remember: Many men who can create or plan brilliantly are duds when it comes to gaining the co-operation of others. Productive participation requires a permissive climate, sensitive listening and a willingness to credit others for their contributions.

Transmitting the Idea

Having arrived at a solution or decision, the next step is to communicate it to those who will put it into effect or who will be affected by it. You must plan carefully what to communicate, to whom to communicate and how best to do it. Whether the communication is written or oral, care must be taken to express it clearly and simply.

The transmitter will want to consider the nature of the group or persons with whom he is communicating and the barriers that may get in his way. Language that is clear to him may be obscure to the receivers.

Words or expressions that seem neutral to him may rub others the wrong way. When Bob Lynch, now president of Atlantic Steel Co., first joined that company he realized that as a northerner he would have to sell himself carefully to his associates. One of his first projects at Atlanta was the organization of a safety contest. In a pep talk to his team, Mr. Lynch, fresh from Ohio, assured the Georgians that their team would take the opposing team "like Grant took Richmond." Fortunately, his listeners, while momentarily shocked,



Tips for better written communication

Do . . .

- Set up a subject for each memo, letter or directive. Write it at the top of the page. It may be the name of an individual or company. It may be a proposal. It may be a single-sentence idea. If you can't specify a subject, don't write.
- Think before you write. Organize what you have to say. If the subject is complicated, make an outline.
- Make the memo clear. Make sure the recipient cannct misunderstand what you say. If words do not come easily, your thinking still isn't crystallized. Reorganize your thoughts. Rewrite.
- Be courteous. You can be firm, and still effective, if you take care not to offend the person addressed. If you write a "chew-out" memo, hold it over to tomorrow. Chances are you'll change your mind and the memo.
- Be brief. Most letters and memos are too long, communicate too little. Say what is necessary, then stop. Do your best to say it on one page.
- Insist that letters and memos be neat. It saves reading time at receiver's end.

Don't . . .

- Use stilted formalities. Forget expressions like: "Your esteemed favor of the 1st inst. to hand . . ."
- Use superfluous words: "Enclosed herewith please find . . ." Say: "Enclosed is . . ."
- Beg or advise. Why crawl? Why preach? Tell or inform.
- Attempt legal lingo. Plain, informal English is more natural, puts your ideas across faster.
- Try to be literary. Keep your language simple, direct.
- Declare ultimatums.

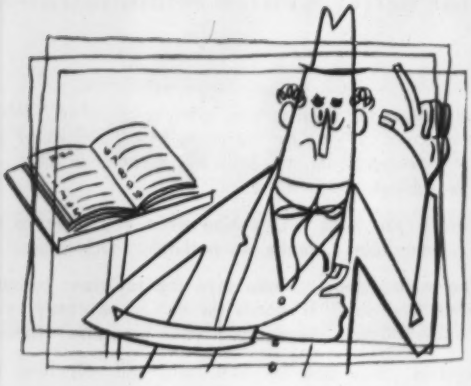
were both understanding and forgiving.

Motivating Others

Understanding is not enough. The communication must be accepted and acted upon. If it states clearly what is to be done and inspires the recipient to want to do it, then, says Mr. Fischer, we have truly communicated.

That is basic in every situation requiring teamwork. It is particularly important when the communication threatens established ways of doing or ways of thinking.

The morale of an organization, and to a considerable degree its productivity, depend on the communication process. Employees who know what is expected of them, who know how their work ties in with the company objectives and who learn about changes before they take place will work with more enthusiasm.



Measuring Effectiveness

Just as communication often suffers from lack of planning, so it suffers from failure to evaluate its effectiveness. Much has been learned about why some conferences succeed and others fail, why some memos are clear and others obscure, why some talks get results and others cause indifference.

It is not enough to talk. You also must listen to find out how good your communications are.

Many devices, other than direct listening, are good sounding boards —attitude surveys, skilled depth interviewing, rumor clinics, gripe boxes. Effectiveness often can be measured by production records, absenteeism and turnover.

But the most important device is the positive listening attitude.

George Nelson of George Nelson & Associates, New York, believes the biggest problem in business communication is that of feedback —getting communication back from the person or persons you are trying to influence. Without feedback, the effect of the initial message cannot be measured, there is no information to guide further action.

Like many industrial executives, Mr. Nelson feels his experience in communication has been fragmentary and tantalizing. Much remains to be learned before a bridge of understanding can be built between management and labor, between superior and subordinate.

Better communication is a continuing challenge to management at all levels. It is a challenge because perfection never will be attained. Yet there are deep satisfaction and tangible rewards for the management man who can influence others. To extend your skill in communicating:

Clarify your ideas. Obtain participation. Talk or write as simply and clearly as possible. Seek acceptance and action by others. Listen to determine your effectiveness.

The ten commandments of communication

Thou shalt:

I Seek to clarify your ideas *before* communicating.

II *Consult with others* in planning communications.

III Consider the *social climate,* as well as the specific situation, when you communicate.

IV Examine *your own true purpose* in each communication.

V Be sure you respect those with whom you communicate.

VI Consider the *tone,* as well as the content, of your communication.

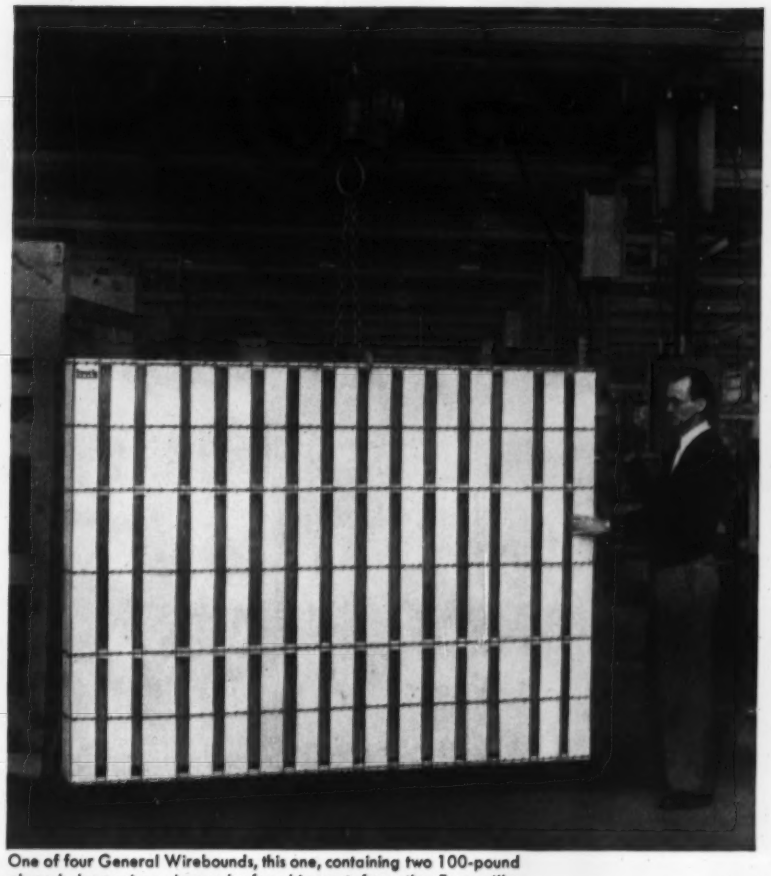
VII Be sure that each message includes *help for the receiver* among its objectives.

VIII Always seek to *understand,* as well as be understood.

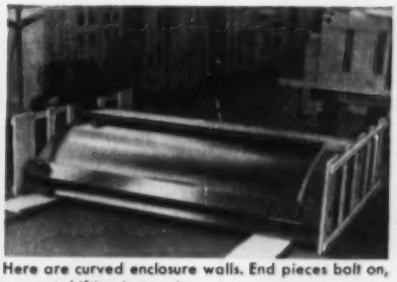
IX Follow up your communication to find out what it meant to the *receiver.*

X *Communicate for tomorrow,* as well as today.

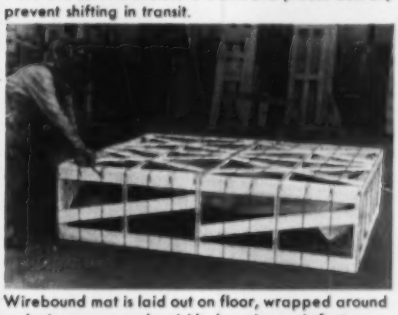
Developed by American Management Association



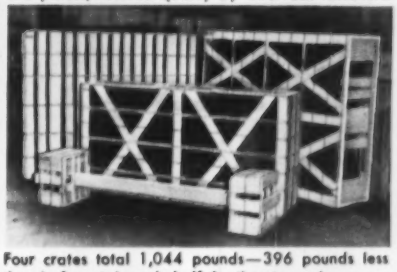
One of four General Wirebounds, this one, containing two 100-pound glazed door wings, is ready for shipment from the Evansville, Indiana, plant of International Steel, largest revolving door maker.



Here are curved enclosure walls. End pieces bolt on, prevent shifting in transit.



Wirebound mat is laid out on floor, wrapped around end pieces, secured quickly by wire rock fasteners.



Four crates total 1,044 pounds—396 pounds less than before, take only half the time to pack.

Revolving door costs turned sharply down by General-Engineered Wirebounds

Shipping a revolving door means packing heavy, costly precision parts—a round ceiling piece, curved enclosing wall, glazed door wings, and an eight-foot shaft with large bearings at each end.

International Steel Co., Evansville, Indiana—the leading manufacturer of revolving doors—ships many per year, is keenly cost conscious. General Box engineers, working with International's Manager of Shipping, recently came up with wirebounds that cut shipping weight by 396 pounds and cut packing time in half, compared with the custom-built nailed crates formerly used.

Total savings from use of the new containers are expected to amount to at least $10,000 a year. As International's management is well aware, it would take a lot of sales to boost profits that much.

General has the testing facilities and the experience to help your company make this kind of progress, too. And it costs nothing to find out what the possibilities are. Just let us know where you are and what you ship. We'll send a man. And ask for your free copy of illustrated booklet, "The General Box."

Factories: Cincinnati; Denville, N. J.; East St. Louis; Detroit; Kansas City; Louisville; Milwaukee; Sheboygan; Winchendon, Mass.; General Box Company of Mississippi, Meridian, Miss.; Continental Box Company, Inc., Houston.

Engineered Containers for Every Shipping Need

• Wirebound Crates and Boxes • Generalift Pallet Boxes • Corrugated Fiber Boxes • Cleated Corrugated and Watkins-Type Boxes • Stitched Panel Crates • All-bound Boxes

General Box

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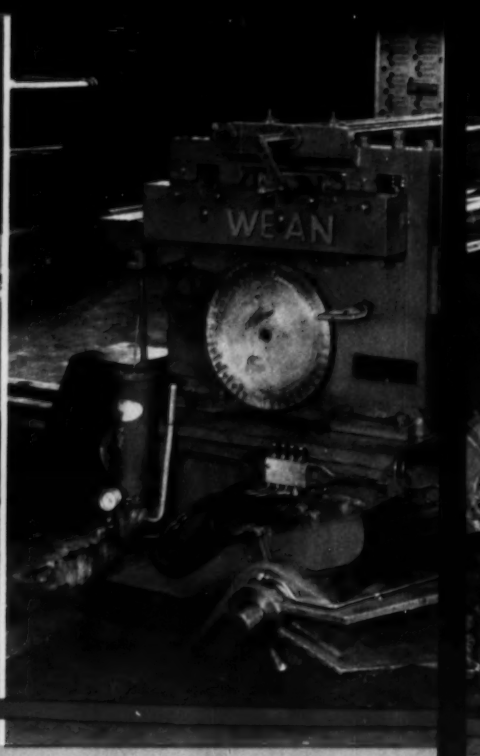
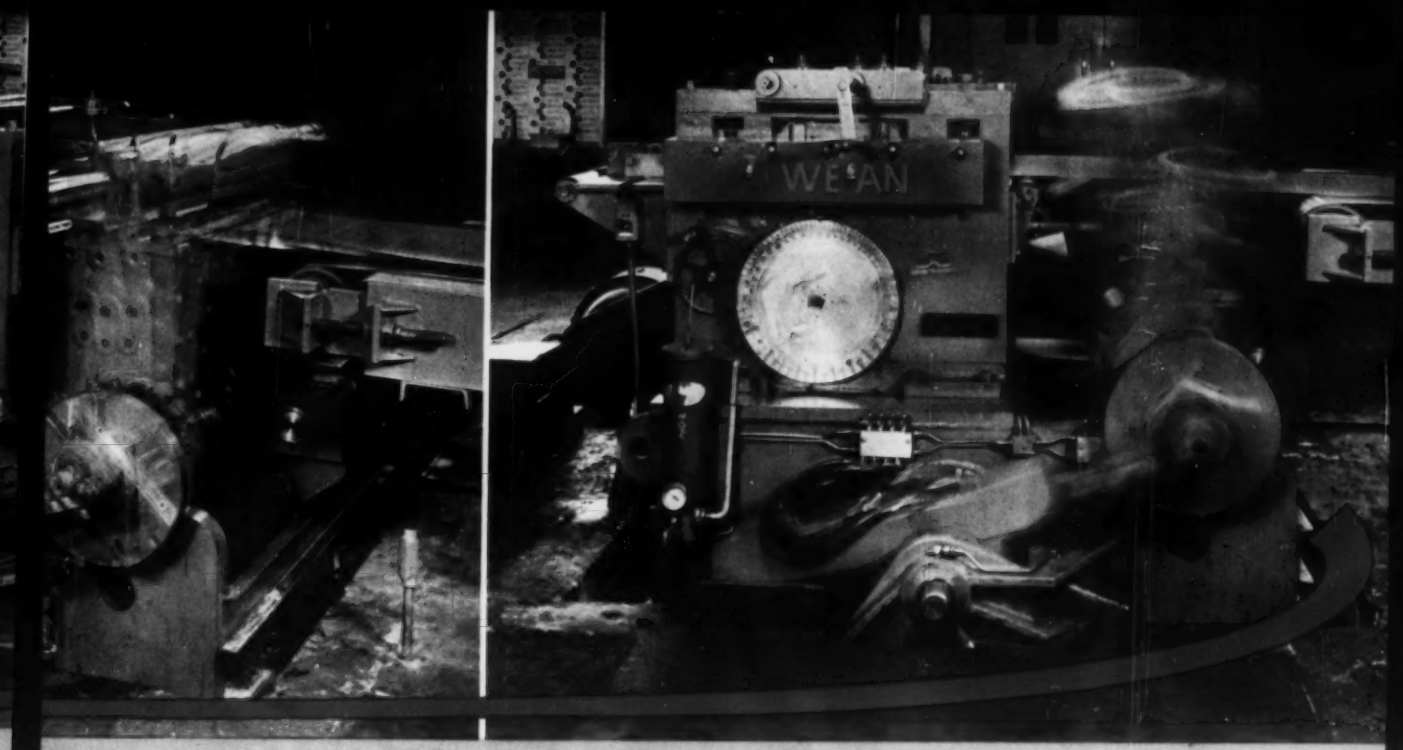
See our exhibit at the National Material Handling Exposition, Chicago, May 16-20



Here's the Amazing Wean That Makes 100 Cuts Per Minute

Saves Bulk Steel Users $20 a Ton

Wean salesmen have a quick and painless method for actually showing you, using your own figures, how, by purchasing steel in coil form, you can save in the neighborhood of $20 per ton on your steel costs. This is an offer you can't afford to overlook. If your plant is situated in an area where a Wean Line is operating we invite you to see it in operation ... talk with the people who operate it ... and we're sure you'll want this great system in your own plant.



Flying Shear Line
to Resquared Tolerance

One-hundred cuts per minute to resquared tolerances . . . that's what users of the amazing new Wean Equipment Flying Shear and Slitting System are getting. That's why, if you are using steel in sheet form, it's important to you to get all the facts.

By purchasing steel in coil form you minimize the mill extras — that sometimes amount to more than $1.00 per hundred weight. You reduce considerably both the personnel required to handle and inventory large steel stocks and the space needed to store various cut sizes of steel of the same gauge and analysis.

And this Wean System provides you with faster production. Here is a shear line that will cut to tolerance at the rate of 100 times per minute. Measure this against your present squaring-to-multiples rate and you'll quickly see how a single Wean line can keep a bank of high speed presses in constant operation.

SEE IT IN ACTION . . . YOU'LL AGREE

There's no comparison! The Wean Combination Slitting and Shearing Line is absolutely the last word in speed, precision and automatic operation. Before you buy let a Wean Equipment man show you one of these lines in operation. Talk with the operators. You'll be convinced. Simply contact the Wean office nearest you. They're listed below.

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COMBINATION SLITTING and SHEARING SYSTEMS

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saves 31% on processing improves mandrel life

for Halliburton Oil Well Cementing Company

A savings of 31% over previous manufacturing methods, was made possible by using externally upset OSTUCO Tubing as Wall Packer Mandrels in "Howco" Expanding Shoe Assemblies. These OSTUCO forgings eliminated a welding operation and reduced machining time and cost. One-piece fabrication greatly improved the useful life of the part.

Compare your tubing costs with job-designed OSTUCO Tubing. *Special-quality* OSTUCO Tubing is manufactured to your individual requirements . . . formed to save processing time and waste. Fill all your tubing requirements on *one* order with OSTUCO'S unique *single-source* service. You'll eliminate interplant shipment, reduce error and speed delivery. Wire, write or phone OSTUCO for complete details, or submit blueprints for immediate quotation.

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117 Liberty Street, New York 6, New York

STEEL

May 16, 1955

Technical Outlook

NEW SAVINGS—You don't have to use metal powder parts in large volume to take advantage of cost savings. That's what B. I. Horton, methods engineer, Pitney-Bowes Inc., Stamford, Conn., told the Metal Powder Association in Philadelphia last week. This is particularly true if design is considered. Pitney-Bowes uses 55 structural powder parts. Quantities range from 1000 (or less) to 10,000. Cost savings (using alternate methods of manufacture for comparison) average 70 per cent.

SUPERTHIN TITANIUM—Can you use commercially pure titanium in thicknesses down to 0.0005 in.? American Silver Co., Flushing, N. Y., already has rolled sheet down to 0.0008 in. in commercial quantities, and it believes it will be making the thinner product soon.

HEARING WEAR—Hook up a microphone to a gear box and listen to the gears wear. There's a correlation between change in gear noise and the beginning of gear pitting, says International Nickel Co.

SPEEDY DESILICONIZING—At Oberhausen, Germany, a process utilizing only 75-per-cent-pure oxygen blown into the hot metal before it is charged into the open hearth shows promise. Object is to reduce silicon by about 0.5 per cent—it also can reduce carbon by more than 2 per cent and sulphur and phosphorus by considerable percentages. Tap-to-tap time is down 12 to 15 per cent. This could be a logical step in any trend to 100-per-cent oxygen steelmaking.

BETTER BRAZING—You can get a shear strength of 48,000 psi in a molten salt bath, or one of 63,000 psi in a vacuum furnace. NACA researchers at the Lewis Flight Propulsion laboratory in Cleveland make the report. With molten salt, shear strength of braze increases as the bath temperature is increased, and variability of results is decreased. In a vacuum furnace, the best average strength is at 2075° F, with a 15-minute holding period. Published figures for hydrogen atmosphere brazing give shear strengths of only 42,000 psi.

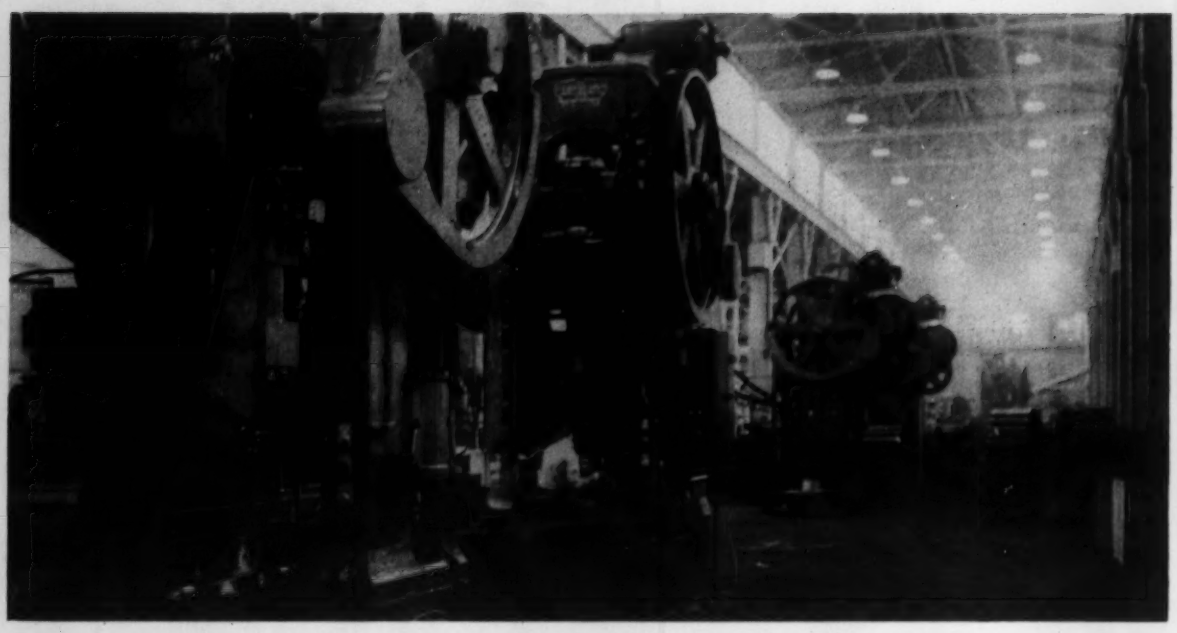
VEST-POCKET TURBINE—A British gas turbine weighing 130 lb is finding uses as a prime mover for air compressors and electrical power generators. It puts out a steady 60 bhp on a 9gph diet of a wide range of distillate fuels and gases.

FOUR ACES—Metals playing the most important roles in atomic power reactor operation are uranium, thorium, beryllium and zirconium, says Henry H. Hausner, Sylvania's atomic energy manager. One of the major problems of using them in reactor design: The enormous stress caused by the intense heat of nuclear fission. It can separate a cladding from the fuel element unless an efficient bond holds them together. A great deal of progress is being made on better bonds, Mr. Hausner states.

TOO SMOOTH—Don't overspecify on surface finish, cautions a Westinghouse engineer. Surfaces that are too smooth, when running in contact, may freeze together because of molecular adhesion.

RUST PREVENTIVES—Aircraft engines dusted internally with a vapor-phase rust inhibitor and treated with preservative oil survived two years of outdoor storage on tropical islands. They needed only minor repairs to be put into working condition. Engines protected internally by oil alone rusted badly in three months. The inhibitor was composed mostly of amine nitrites.

Metalworking Outlook—p. 57 *Market Outlook—p. 147*



Short-stroke presses like these do the blanking, perforating and forming of the cartridge tube

Cartridge Making on Standard Machines

Multipiece design puts recoilless shell production within bidding of a greater number of shops. Standard, short-stroke punch presses are the key tools

By R. J. WILCOX
executive engineer
Motor Wheel Corp
Lansing, Mich

THE ARMY'S new, hard-hitting, 106-mm recoilless rifle can knock out any tank in the military world.

What the government wanted was a production technique so standard that just about anybody in metalworking could turn out cartridge cases for it.

That's where multipiece design comes in. With the coming of this new gun, the feasibility of using multipiece design to make cartridge cases became more important. Motor Wheel Corp., Lansing, Mich., got the job of pioneering the manufacture late last year. Here's what came out of that work.

Commercial Materials — Standard, cold-rolled commercial sheet is sheared to develop blank size and shape. Conventional, short-stroke mechanical punch presses are used, two strokes per blank—putting 1160 holes (5/16-in.) in a predetermined pattern in the blank.

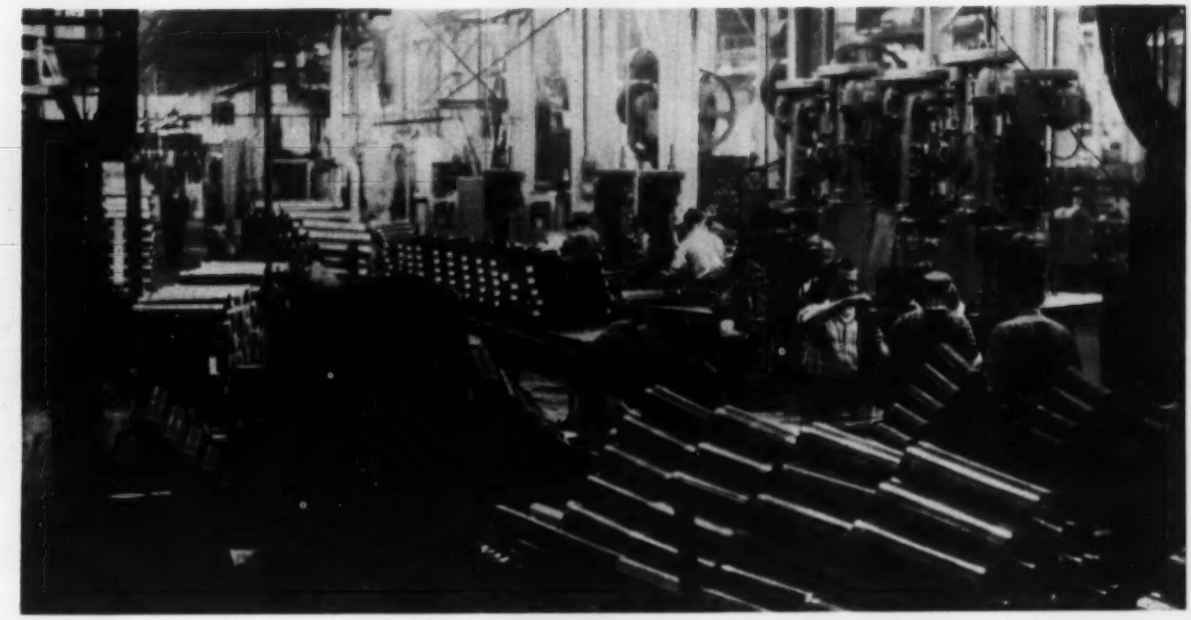
The perforated blank is trimmed to a developed contour and formed into tubular shape in three die operations—all of which are performed in short-stroke presses of the most common type. After tubes are washed, they go to one of two, direct-current, submerged-arc welding units.

Welding—Designed to operate as individual units, each welder has two stations which can be used singly or simultaneously. Weld penetration is maintained at 100 per cent. Waste tabs are placed at each end of the tube to eliminate burnout at tube ends.

After welding, waste tabs are removed. The seam weld is scarfed in a flash-trimming machine and tested in a hydraulic expanding fixture. After re-sizing and washing, the tube is ready for assembly.

Tube-Head Assembly — While tubes are made, the head is rough machined from a C-1117 forging on a spindle automatic lathe. This operation calls for turning the pilot diameter, drilling the primer hole and rough facing.

Tube and head are assembled with a press fit in a hydraulic as-



After tubes are welded and sized, tube and head are assembled in a hydraulic fixture before brazing

sembly fixture, then copper brazed in a hydrogen-atmosphere furnace. The assembly is re-sized in a conventional-type mechanical punch press, utilizing dial feed for ease in loading and unloading.

Finish Up — Washing and heat treating follow. The latter combines in one automatic unit a hardening furnace, brine quench, mouth anneal and draw to Rc 30 minimum, followed by cold and hot rinses. Then the assembly is sized and tapered to finish form dimension.

For the next operation, the assembly is chucked on the OD at the center portion of the case, piloting on the ID of the mouth end. This leaves both ends exposed for simultaneous finish machining on a single-spindle lathe.

Remaining operations: Taper reaming of the primer hole on a single-spindle drill press, final inspection, marking and varnishing for protection.

Aside from proving out a production technique that could be applied readily in a large number of existing metalworking operations in an emergency, Motor Wheel discovered other advantages. They include: A production rate greater than that afforded by deep drawing and appreciable savings in materials and process time.

Then comes washing and heat treating before the final sizing and tapering to finish dimensions

Both ends are finish machined simultaneously on a single-spindle lathe. Primer hole reaming is last production job

As a testing method it has some aces up its sleeve. One of them is its skill as a thickness tester—another is its ability to tell nodular from gray iron

Wall thickness of these gas cylinders is checked ultrasonically. It's part of the quality control system at Taylor-Wharton Iron & Steel Co., Easton, Pa. Cylinder is mounted on a rack for rotation

Ultrasonics Makes Itself Heard

ARE YOU doing all you can with ultrasonic testing? Surprisingly versatile, the method that got its start as a detective looking for subsurface flaws has much to offer as both a quality and a dimensional checker.

Now you can measure wall thickness and check for corrosion or erosion loss on pressure vessels, cylinders, etc. Ultrasonics also can be used to check metallurgical structure.

Vibrations—In thickness measuring for example, the method works like this. A high-frequency oscillator, usually operating somewhere between 0.5 and 10 megacycles (mc), sends its electrical impulses through a piezoelectric transducer. (Piezoelectricity is due to pressure in crystals.) This transducer converts the electrical impulses into continuous high-frequency sound waves that are sent into the part under test. Frequency of the waves can be varied so the wave lengths also vary.

When the thickness of the metal is a half wave length, or a multiple of it, the metal will resonate. This increases the loading on the

By PETER K. BLOCH
Branson Instruments Inc.
Stamford, Conn.

transducer which increases the plate current on the oscillator. When the increase is detected, it can be read as thickness in inches. The detector may be a set of headphones, a meter or an oscilloscope.

Visual Conversion—On the oscilloscope indicator the horizontal base line represents a frequency range, such as 2 to 4 mc. If this frequency range includes resonant frequencies for the material thickness, vertical lines appear on the screen at the appropriate frequency. Removable calibrated scales, placed in front of the cathode ray tube, make it possible to read these lines directly in terms of thickness.

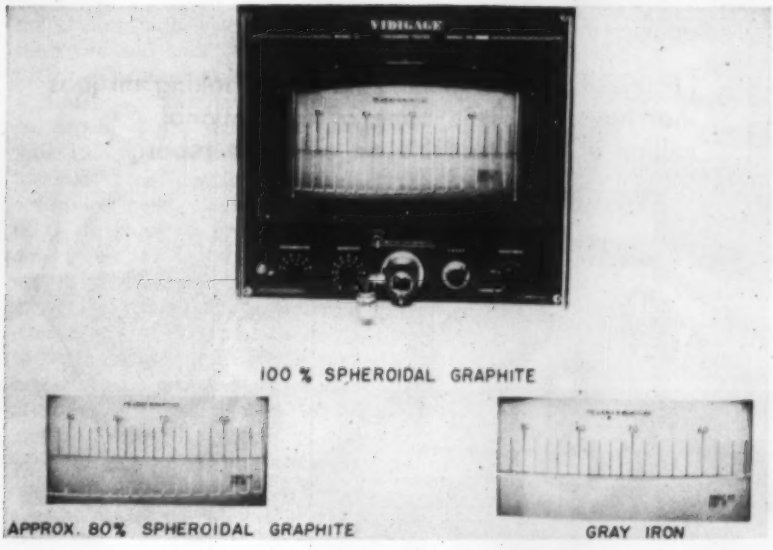
Plate thickness is inversely proportional to the fundamental frequency. High frequencies generally are used for thin sections, low frequencies for thick materials.

Broadened—Use of an electrically variable inductor in the oscillator circuit, and a 21-in. television tube, has increased the usefulness of ultrasonics for shop and field inspections. The small plug-in sweep oscillator containing the variable inductor, can be separated from the main chassis by extension cables 1000 ft or longer.

The thickness indication on the 21-in. television tube is sufficiently bright to enable the operator to check large structures, and read the thickness from a distance of 10 or 25 ft under shop conditions.

Ranges—The sweep of the variable inductor can be varied continuously over a wide range. This in turn adjusts the frequency and thickness range of the gage. This adjustment makes it possible to design an almost unlimited range of thickness scales for optimum performance on a specific application.

High precision, in the order of 0.1 per cent, is readily obtainable over a limited thickness range; measurements within 1 to 2 per cent can normally be expected when a wide range is covered. Since sound velocity is only slightly affected by small changes in chemical composition, the same scale can be used over a fairly



Screen indications on the oscilloscope show difference between nodular iron and gray iron.

Instrument checks for corrosion loss in used gas cylinders

wide range of alloys. For example, a steel scale can be used on carbon steel, stainless steel, Inconel, nickel, cast steel and ductile iron.

While steel scales can be used for rough measurements on aluminum, it is better to use special scales. Another scale would be used for copper and most brass and bronze alloys.

Where—Ultrasonic gaging immediately after extrusion is a practical method for complete inspection of extrusions and rejection of excessively eccentric sections. Gross discontinuities are simultaneously detected. High and low limits and limits for eccentricity can be marked on the scale, so the inspector can readily determine acceptability.

Gun barrels, propeller shafts and high-pressure steam pipes are frequently bored from solid forgings or rough castings. The cutter may run off center, resulting in a variation in wall thickness. The average weight of the tube is still correct, and it may also pass static balancing tests.

This variation in wall thickness can be detected with ultrasonic equipment, during the machining process, or after installation.

A number of defective propeller shafts, which were covered with 2 in. of rubber on the outside, were tested successfully after installation by applying the transducer to the inside, and spiraling it through the section which is 50 ft long.

Narrow Range—In many cases the thickness of the part is already known within plus or minus 0.020 in., so a scale covering a narrow thickness range can be used. The narrow range scales can easily be read to 0.1 per cent.

Wide Range—Jet aircraft wing sections utilize integrally stiffened sheet, sanded and milled to close tolerances. The sheets are large, making mechanical gaging difficult. Over 100 inspection points, ranging from 0.050 to 1.7 in., may be located on a single sheet.

Ultrasonic gaging from one side, within ± 0.002 in., is possible by using a large number of scales, each scale covering a band width of $\frac{1}{8}$-in.

Structure — All ultrasonic test instruments are affected by internal properties of the material. In general, highly worked, small grain-size materials transmit well at high and low frequencies; gray iron castings generally transmit only at low ultrasonic frequencies, around 1 or 2 mc. Strength of the resonance indications at various frequencies is a good measure of the ability of the material to transmit the ultrasonic waves.

For example, it is easy to distinguish between gray iron (flake graphite) and ductile iron (spheroidal graphite) by observing resonance indications at relatively high frequencies, such as 5 to 10 mc. Gray iron gives no indications at all; ductile iron gives strong signals across the whole band. Intermediate grades, such as 80 per cent spheroidal iron, will produce fairly strong resonance indications at the low frequencies around 4 or 5 mc, but no indications at 9 mc.

Flaws — Ultrasonic waves are reflected by metal-air or metal-liquid interfaces. Thus, it's possible to pick up laminar discontinuities within the metal and lack of bonding between two materials. While the equipment generally is not capable of detecting minute discontinuities, it will detect discontinuities with an area of $\frac{1}{2}$-sq in. in the plane of the test surface.

Lamination or "pipe" in tubes and sheet is detected by a sudden change in the indication. Laminations frequently are close to the center of the thickness, since they may be produced by insufficient cropping of the ingot, or by edge-overroll in sheets.

Centerline lamination is detected most conveniently by setting up the instrument to produce three or four indications on a sound section. When there is a lamination, every other indication will disappear, indicating half thickness.

In aircraft plants, etching tanks are taking on jobs that have been the bane of conventional milling equipment. It's an old idea reborn

Chemically milled aircraft skin

Milling Goes Chemical

CHEMICALS are milling more than 70 aircraft parts at North American Aviation Inc., Downey, Calif. Aeronca, Boeing, Beach, Grumman, Lockheed, Northrup, McDonnell and Rohr are using the same process.

"Chem-Mill" is its proprietary name (licensor is Turco Products Inc., Los Angeles). It's a method of controlled depth etching with these important advantages:

1 It can be done after forming.

2. It is not limited (as conventional milling is) by shape of part, direction of cut or cutter radius.

3. It is applied easily to complex contours.

4. It can mill both sides of a part at once, avoiding warpage.

5. It permits great versatility in design, especially of integrally stiffened structures.

6. It is fast, because it can work on many areas at once.

7. It can hold close tolerances: ± 0.002 in. is possible, ± 0.003 is routine.

8. It makes tapering sheets and tubes an easy job.

9. It permits varied depths of cut.

10. It needs no highly skilled operators. The process lends itself to automation.

11. It yields a surface that requires no finishing or polishing. There's no problem of notch sensitivity. Surface finish is 45 rms minimum.

12. It uses conventional cleaning and pickling equipment. If you have that, plus a spray booth and a drying oven, you're in business.

Clincher—And it's inexpensive. North American says that one chemical milling installation costing $30,000 can do the work of three milling machines costing $600,000 on the right kind of jobs. Biggest use now is on thin panels, but it can do excellent work on forgings, deep-drawn parts and tubing.

When castings are chemically milled, some objectionable cratering may develop where the etchant bites into the pores, but don't rule out castings as a prospect.

How It's Done—Since this is an etching process, parts that aren't to be eaten away must be masked. This can be done by mechanical masks, adhesive tapes, sprayed or brushed organic coatings, silk-screen printing, photosensitive coatings or plating.

A widely used technique at North American is to cover a panel with masking tape. Using a template as a guide, a worker cuts through the tape with a knife, leaving it only on areas to be etched. The entire panel is sprayed with a latex coating. When the rest of the tape is stripped, it leaves bare metal areas surrounded by paint-protected areas.

The etch has a tendency (which can be closely controlled) to undercut the mask. Allowance is made for this action in the template.

Etching Bath—For aluminum, a strongly alkaline etching bath is used. It is enhanced by additives to produce a smooth surface, a uniform etch with good fatigue characteristics and thorough wetting. Etching rate is 1 mil a minute.

Resulting by-products are hydrogen and alumina. The hydrogen is disposed of by conventional tank venting equipment and could be recovered. The precipitates are recovered by filtering or settling.

Sequence—Parts must be cleaned before masking. They go through a solvent degreaser, hot alkaline cleaner, cold water rinse, chromic acid dip and hot water rinse. Then they go to a preparation area for masking.

After masking, parts go through

the etching bath, cold water rinse, smut removal bath, mask removal bath (or hand mask removal) and a final hot water rinse. Parts to be taper etched go to a deep tank in which they are raised or lowered gradually by a timer-controlled hoist. Length of time taken to raise or lower the part determines the degree of taper.

Timing—Controlling depth of etch is simplicity itself. A fuse, exactly the thickness of the metal to be eaten away and of the same material is connected to an electrical circuit and placed in the etch with the part. When the fuse is eaten through, it opens the circuit, actuating a warning device or the hoist which lifts the parts from the bath.

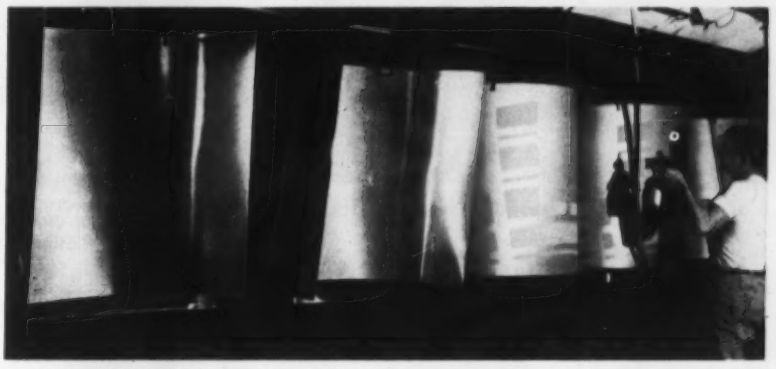
An accessory method makes use of adhesive tape. It is stripped away on a timed sequence to produce varied depths of etch on the same part.

Etching's Place — The photographs give a good picture of the versatility of chemical milling. It does a superior job on integrally stiffened and tapered panels. It is a fast, accurate method for thinning the webs on forgings. If desired, the entire forging can be made oversize and etched to final dimensions without masking.

There's no doubt that in the aircraft plants chemical milling is making heavy inroads. For jobs on which mechanical milling is slow or difficult, chemical milling has a bright future. It supplements and extends milling's range in the nonferrous metals. What it will do on steel remains to be seen.

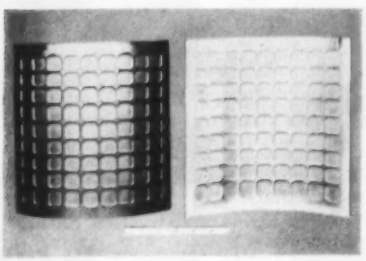
• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department,* STEEL, *1213 W. Third St., Cleveland 13, O.*

Masking duct skins for the F-100 Super Sabre. Skins are masked and stripped after the part is formed

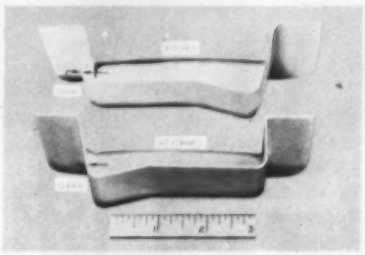


Spraying masked duct skins. When the paint dries, masking tape will be removed and the part etched

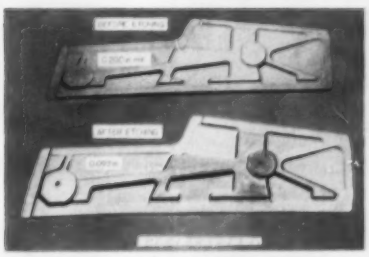
Inspecting the finished product. Production tolerances are ±0.003 in. for chemical etching



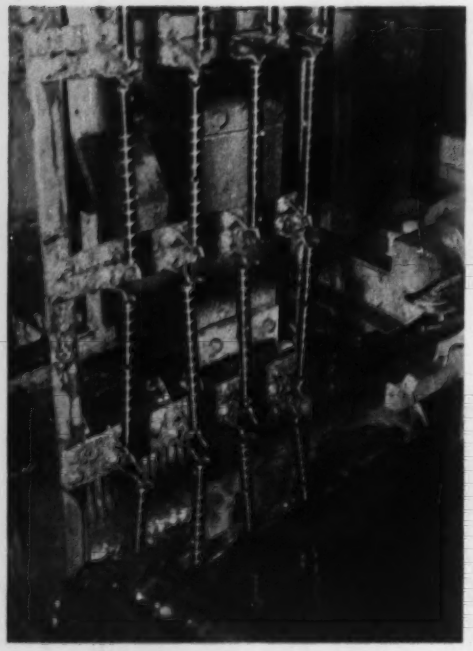
Sandwich panel. Ducts can be etched, too



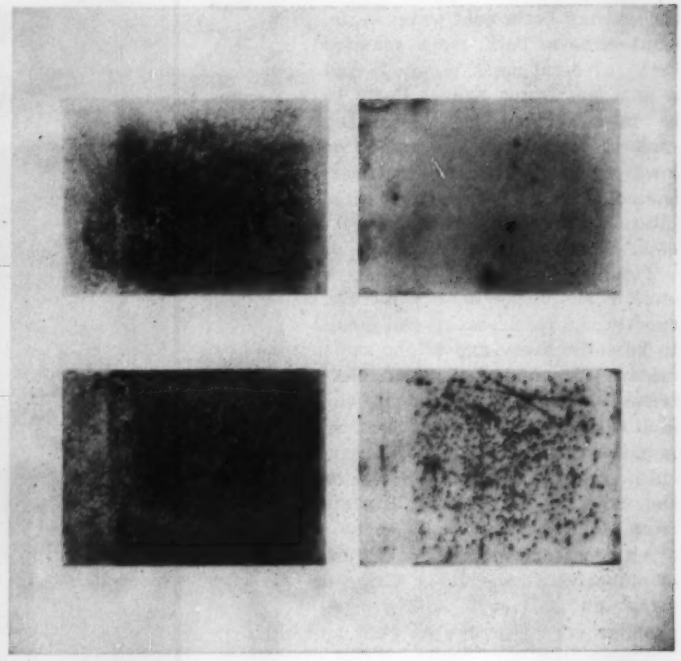
Thinning metal by etching after drawing prevents tears



Forging reduced to specifications by etching



Maytag Co. is plating parts like these with crackless chrome



Ordinary (left) and crackless chromium (right) on steel—after five months outdoors. Plating: Top, 0.0005 in.; bottom, 0.0002 in.

Crackless Chromium Foils Corrosion

CHROMIUM plated directly on steel has gone to work for the Maytag Co.

The company is using a 10-step process devised by United Chromium Inc. to plate matte chrome on 15 automatic washer and dryer parts. It by-passes the customary copper plating, nickel plating, buffing sequence and gets around recurring nickel shortages.

No Cracks — Final dividend shows in the name of the process, "Crack-Free" chromium. Bright chrome surfaces have minute pores and cracks, says United Chromium. A surface without them won't let corrosion get started.

Maytag engineers tested the surface for wearability. Their decision: It makes a wear-resistant surface as good and possibly better than those chromium plated by other methods.

Exposure to 100-per-cent humidity at 120°F for a full year produced no effect on 0.3 and 0.5 mil chrome on steel.

Catalyst—Core of the process is a new-type catalyst. It is used in a chromic acid bath.

The bath automatically regulates the concentration of catalyst. It has good throwing power; plating speed is about the same as for ordinary chromium.

Production—Maytag is using a chainless return-type automatic plating machine. The cycle includes anodic cleaning, anodic etch, plating and soluble oil dip, with rinses and sprays after cleaning and plating. At full capacity the line will take 25,000 to 30,000 amp at 8 v.

Plate 0.2 to 0.4 mil thick is deposited in 18 to 20 minutes. This is a little better than 0.9 mil per hr at a current density of 3 amp per sq in. Temperature is held at 150±1°F.

Parts up to 17 in. long and 1¼-in. in diameter are being plated. Except for a copper pivot, all are steel.

Finish before plating is 30 to 50 rms; after plating, it is 3 to 7 rms.

Still New—Since 1953 when the process was announced, manufacturers of calculating machines, steam boilers, aircraft hardware, tools and dies, hydraulic cylinders and steel tubing have been trying it on a pilot scale. Maytag finished a year's pilot run and went into full production in February.

A silverware manufacturer is plating embossing dies by the new process. He reports 20 per cent longer die life. A manufacturer of aluminum tumblers eliminated sticking and seizing in his drawing dies by plating them. A steel tubing producer is considering using the process, then buffing for a bright finish.

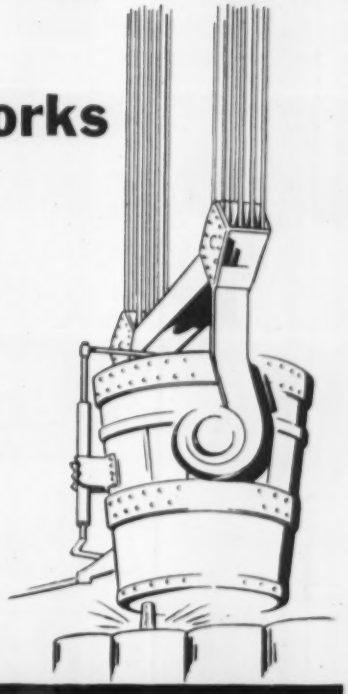
Decoration — Automotive applications can be expected if the cost of buffing to a bright polish proves low enough. The coating is said to buff easily, much like dull nickel plate.

A two-tone finish—the natural light - gray, matte finish with buffed highlights—is being used for furniture hardware.

INGERSOLL-RAND BOILER FEED PUMPS

Serve Steam Plant at

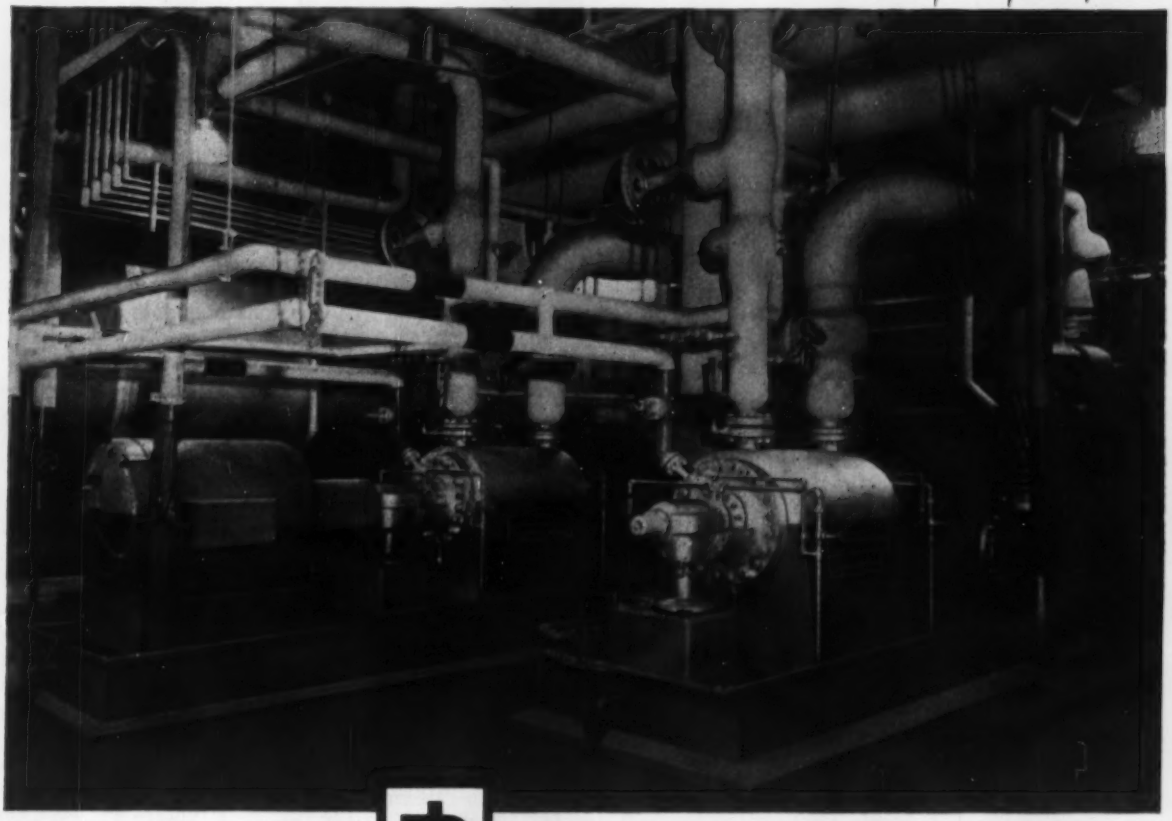
U. S. Steel's New Fairless Works



Steam, though not an *ingredient* of steel, is vital to its production, heating buildings and pickling lines, generating electric power and driving I-R pumps and blast furnace blowers. The steam plant at U. S. Steel's New Fairless Works rivals many a large central station for size, efficiency and modern equipment.

Its high pressure boilers, for example, are served by five Ingersoll-Rand Class CHTB, 7-stage boiler feed pumps, two of which are shown below. Each delivers 700 gallons of 240° boiler feed-water per minute at an intake pressure of 17 psig and a discharge pressure of 1042 psig. A steam turbine driven unit is shown in the foreground, while the pump at the rear is arranged for dual drive, either by direct-connected electric motor or steam turbine.

When it comes to boiler feed pumps, Ingersoll-Rand's experience is second to none. Why not let this know-how help you save time, effort and expense on *your* next installation. Ask your I-R representative or branch office for complete information.



PUMPS • COMPRESSORS
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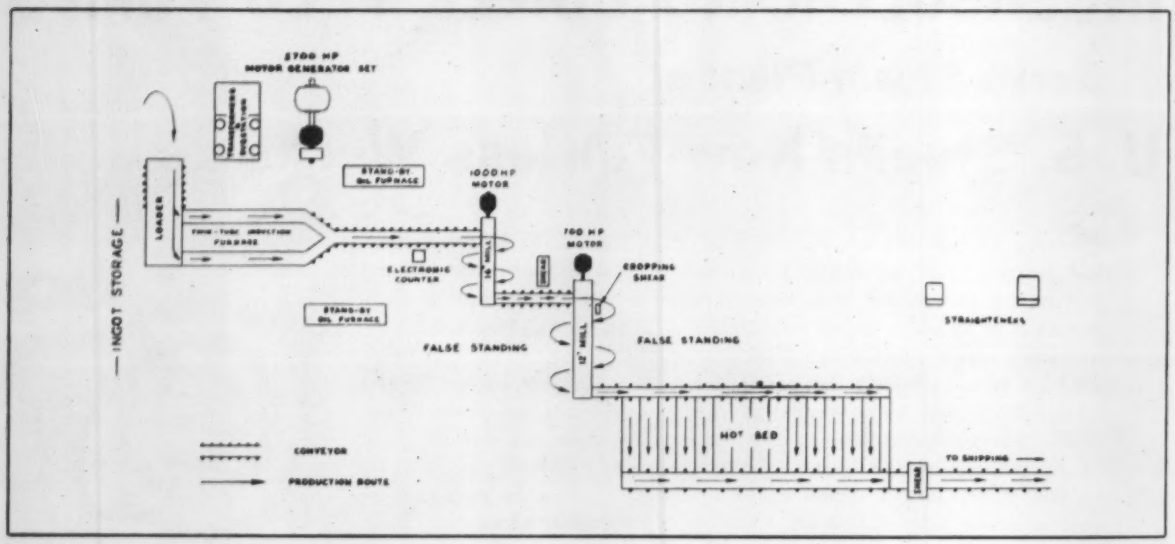
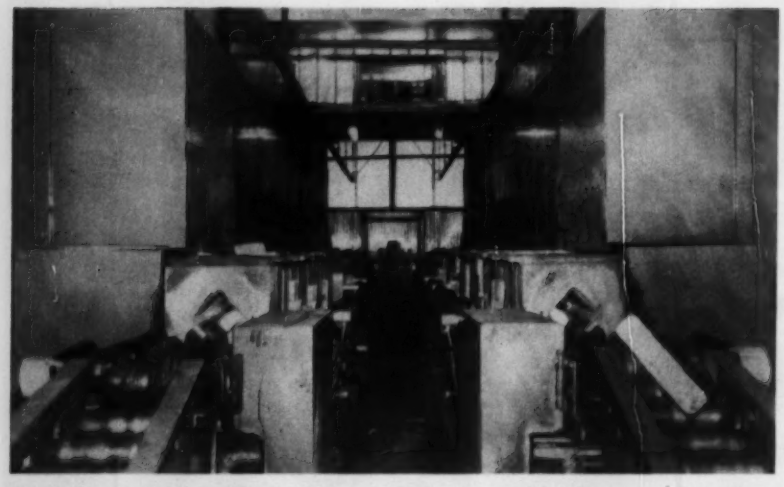
Cameron Pump Division
11 Broadway, New York 4, N. Y.



This mill's costs are down and production is up now that . . .

Induction Heats the Ingots



Ingots leave the heating coils in a steady stream, first from one side then the other. It takes 10,000 hp of energy to power the coils

DUAL-FREQUENCY induction heating of ingots at the Vancouver (B. C.) rolling mills of Western Canada Steel Ltd. broke the heating bottleneck. Improved finishing facilities couldn't be operated at capacity with existing furnaces.

Factors influencing Western's decision: Low-operating costs and the promise of high-quality finished products. Despite the high initial investment (slightly over $500,000), company officials are convinced they made the right move.

Cuts Scale Losses—One feature that weighted the balance in favor of induction heating was the reduction in normal scale loss experienced in conventional heating furnaces. It used to average between 3 and 5 per cent, now it's less than 2 per cent. This alone accounts for a saving of about $1.50 a ton.

Something less than 10 minutes elapses from the time a cold ingot enters the plant until it is a finished bar on the hot bed. No more than 8 tons of ingots are in process at a time, which makes for a highly flexible, merchant mill operation. The furnace can be started or stopped practically at the touch of a button.

Two Units—To keep down overall length, the unit was designed with two identical parallel tunnels. This adds flexibility, since either side can be operated independently.

Heating takes place inside the coils which have been heavily insulated and cast in a plastic refractory of high density and strength. High-silicon ceramic liners keep ingots from abrading the refractory. Since heat is generated within the ingot, it is possible to keep the furnace structure and even the outside surfaces of the tunnels cool.

Power Consumption — For the largest ingots, it takes 300 kw-hr

CANNON FOUNDRY
SIXTEENTH CENTURY

Cannon was as revolutionary a weapon in 1500 A. D. as the H-bomb is today. "Hooped cannon" made of iron strips banded together exploded so often that gunners fared as badly behind a gun as did the enemy in front. Then foundries began to cast solid cannon in crude molds as shown in this reproduction of an old Dutch engraving—and no longer could walled cities stand up under "modern" cannonading.

Crafts and craftsmen through the ages

NUMBER FIVE OF A SERIES

Basic Refractories not only furnishes its customers with the finest refractories available, but also employs skilled craftsmen — men with practical steelmaking experience — to insure that the use of these products gives full value.

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Specify Pearlitic Malleable Castings

FOR STRENGTH WEAR RESISTANCE
MANUFACTURING ECONOMY

Pearlitic malleable is a specially processed malleable iron. It possesses an unusual combination of toughness, ductility and machinability.

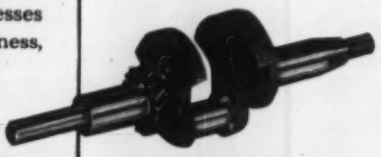
• Pearlitic malleable has exceptional bearing properties—in many applications allows the elimination of brass or bronze bushings.

• Pearlitic malleable has high yield strength, from 45,000 to 80,000 psi to meet your requirements.

• Pearlitic malleable is easily machined and has excellent finishing qualities—readily acquires a smooth mirror-like finish.

• Pearlitic malleable can be selectively hardened by flame, induction or immersion methods for even greater wear resistance.

Write to the Malleable Founders' Society for names of foundries that make pearlitic malleable castings and for complete specifications.



Small Engine Crankshaft

Automotive Rocker Arm

Diesel Engine Piston

Universal Joint Yoke

Malleable
FOUNDERS' SOCIETY

1800 Union Commerce Building Cleveland 14, Ohio

a ton or better, including all losses. Rate of output varies from 20 to 25 tons per hour. With smaller ingots, average power consumption is higher and the rate of flow somewhat less.

One of the most striking features is the heatup speed. Here are data for the various ingot sizes:

Size (in.)	Time (minutes)	Output (tons/hr)
4 x 4 x 36	3.6	15
4 x 4 x 42	4.25	15
5½ x 5½ x 43	4.75	20
5½ x 5½ x 45	5.0	20
5½ x 5½ x 56	5.50	20
6¼ x 6¼ x 49	8.4	20

Four men operate the furnace. Higher production will not require a larger crew. Working conditions have been improved considerably.

The Operation—Fork-lift trucks bring the ingots from stockpiles to the walking-beam table. Ingots are spread out and advanced to another table fitted with flat, rubber conveyor belts which carry them forward to the feeders.

More automatic handling equipment carries them one at a time from this point to the feed trough. A hydraulic ram pushes them into the heating tunnel. The line of ingots is continuous. As one is pushed in, a hot one emerges from the discharge end. Interlocks keep the two lines in step, so that ingot feed is timed properly for mill consumption.

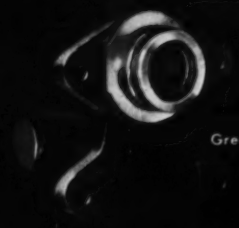
Power Supply—About half the power consumed is applied to the line at standard, 60-cycle frequency. To achieve best efficiency, the balance is converted to a higher frequency in a generator driven by a 5000-kva synchronous motor.

A total of 7000 kw of energy is required. The 540-cycle energy is supplied at 400 v, the 60-cycle at 550 v. Power comes from the British Columbia Electric Co. Ltd. to three, 3000-kva, water-cooled transformers for step down from 60 kv to 4 kv.

The heating unit was built by General Engineering Co. Ltd., Toronto, Ont. Only 75 per cent of the furnaces' ultimate productive capacity has been realized, but before the year is up, Western expects to boost production and cut heating costs even further as operators become more familiar with the equipment and its operation.

GREENLEE

special-purpose machines for profitable mass production



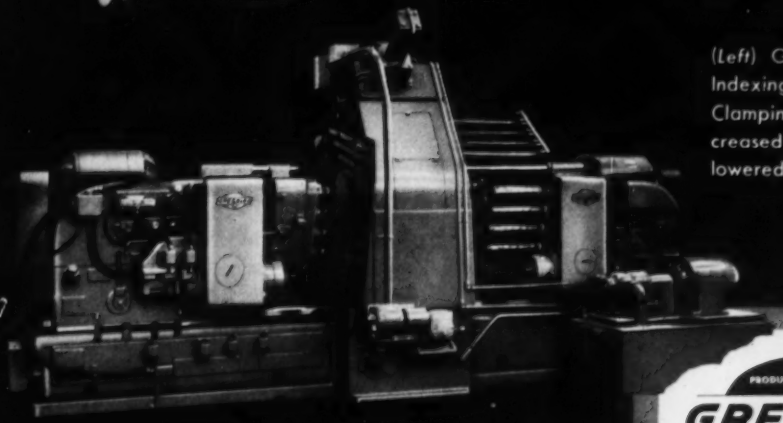
Master brake cylinder machined on above Greenlee Special Machine.

THEY SAVE WORK...THEY SAVE MONEY

If you are being outdistanced in today's swift race for production...faced with narrowing profit margins...it will pay to investigate Greenlee Special Machines. Savings effected on drilling, reaming, boring, counterboring and tapping operations will quickly amortize your invested dollars.

Wheel cylinder machined on Greenlee Special Machine shown below.

(*Above*) Greenlee Horizontal Indexing Machine designed for processing master brake cylinders has proved itself with raised quality and lowered costs.



(*Left*) Greenlee Two-Way Horizontal Indexing Machine equipped with Power Clamping and Automatic Unloading increased previous production rates and lowered costs.

WRITE FOR COMPLETE INFORMATION

PRODUCTION MACHINERY
GREENLEE

GREENLEE BROS. & CO.
1925 MASON AVENUE
ROCKFORD, ILLINOIS

BRIDGEPORT'S HIGH I.Q. BRASS

means production savings

The right grain size can often mean the difference between a poor finish produced at high cost and a gleaming, lustrous finish made at substantial savings. This is one of the *High Inner Qualities* you can count on in Bridgeport sheet and strip brass. Bridgeport offers a *range of grain sizes* . . . can help you select the *right* one, combined with other *inner qualities*, to boost production and lower costs.

Our nearest sales office will be glad to show you how to profit with Bridgeport sheet and strip. Let us put Bridgeport *High I.Q.* to work for you today.

Bridgeport folder on grain size, "The 4th Dimension," will be sent to you on request.

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Grommet Seating Tool

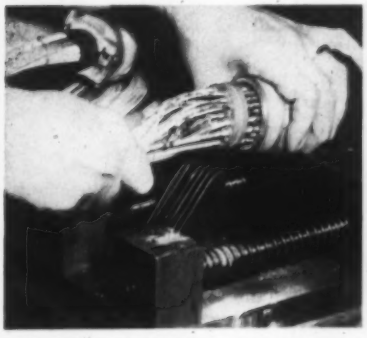
It will handle most contact arrangements, and it can be adapted for smaller parts

A NEW TOOL for seating connector grommets is speeding operations in the electrical manufacturing department at Convair, Ft. Worth, Tex.

The grommet fits onto the back of the connector (wires are threaded through it) to seal the uninsulated solder pots from humidity and vibration. Grommets used to be forced into seat by hand, resulting in many rejects because of broken insulation and torn grommets.

Foot-Operated — The tool now used is similar to a vise. It has a movable back jaw, padded with rubber sheet. Fixed parallel metal plates, like fingers, make up the front jaw. Pressure on a foot pedal closes the vise through a pulley-cable arrangement.

Connectors, which are of flexible-insert type AN, are prepared by threading the wires through the grommet and soldering them to their respective solder pots in the connector contacts.



FOOT-OPERATED VISE
. . . makes grommet seating easier

Seating — Then, the operator places the connector against the face of the back jaw, fits the wiring harness through the parallel plates and, with steady foot pressure, closes the vise. The grommet is forced to seat without damaging the wires or the grommet.

Spacing of the metal plates is common to most connector wiring arrangements. But it can be varied to handle smaller components.

NILSON 4-SLIDE TAKES A TOUGH ONE . . .

Mass production of body trim clips for a leading make automobile proved a complex forming problem. A. H. Nilson's 4-Slide (Model S-4-T) did the job, forming .025" x 3", 1065 C.R.A. steel at 54 strokes per minute! Accurate, fast, and automatic, Nilson 4-Slides keep pace with one of the nation's biggest industries.

THIS ONE WAS EASY . . .

A Nilson 4-Slide, Number 1, forms 150 drapery hooks per minute from 0.70 basic steel wire. Nilson 4-Slides form wire or ribbon stock from the coil. They straighten, feed, pierce, blank, swage, stamp or coin, cut and form in one, fast, automatic operation . . . accommodate wire up to .5" dia., in feeds to 32" max., and ribbon up to 3.5" wide. Press sections from 5 to 75 tons.

A. H. Nilson provides forming recommendations from detailed information without obligation. Send for catalog.

A.H. NILSON MACHINE COMPANY

1512 RAILROAD AVENUE, BRIDGEPORT 5, CONNECTICUT

Automatic Chain Making Machines : Staple Forming Machines : Wire Stock Reels
Wire Straightening Equipment : Slide Feeds for Presses : Wire & Ribbon Stock Forming Machines

Take an alloy that doesn't like to be pushed around and work hardens at the drop of a hammer. Pull it slowly and you can coax it into shape

It fits. Hand pressure is enough to mate the part to the gaging fixture

Titanium Stretch Forming: Easy Does It

WHEN IT COMES to forming, titanium can be stubborn.

The people at Cyril Bath Co., Solon, O., are pulling some of the orneriest and getting away with it. It's Rem-Cru's A-110-AT, a new alpha-type titanium, with 5-Al, 2.5-Sn as alloying elements. What makes it so tough is that its minimum yield point, 110,000 psi, sits right on top of its minimum tensile point, 115,000 psi (typical elongation, 18 per cent in 2 in.).

Over-Reach—What's more, Bath is forming the stuff on a 50-ton radial draw former. It's the biggest former in the plant, although the company makes them bigger.

While it's nice to demonstrate that your equipment will outperform its rated capacity by 10,000 lb, performance in this case is more important as a demonstration of stretch-forming technique. It shows that beef isn't the whole story.

Rule of Thumb—When you are cold forming titanium the rule is: Take it slow and easy. More than for most other metals, titanium's yield strength is a function of strain rate. With a slow pull, it stretches; with a fast pull, it breaks.

Although Bath is primarily an equipment manufacturer (radial draw formers, press brakes, tangent bending sequence presses), the company also does contract forming for the aircraft and truck-trailer industries. This titanium job is a jet engine part.

Strip Tease—It starts as a piece of 0.096 strip, trimmed to about 8 x 75 in. Edges are rounded by grinding to eliminate potential points of notch weakness.

As formed, the part looks like half a cylinder of 3 ft diameter, shifting abruptly 8 degrees to half a cone. To make it, one edge of the strip has to be stretched $2\frac{1}{16}$-in. more than the other.

The transition between cylinder and cone must be straight and true. That rules out forming the 8-degree bend first on a press

brake, as the bend line would tend to wave and wander in stretching. The bend has to be formed by stretching and ironing around a die which is the shape of the finished part.

Former—The radial draw former first applies longitudinal stretch (about ¼-in. for this part) with a hydraulic puller. Then the part is radially stretched by wrapping it around a die mounted on a revolving table. At the same time, the part is ironed against the die by a bronze wipe shoe under 15 tons of pressure. It's all done at the slowest machine speed.

Besides objecting to being stretched, A-110-AT is also hard (Rockwell C 30-35 at room temperature). The teeth on the gripper heads of the forming machine won't bite into it. Bath is solving that by lining the gripper teeth with emery cloth. Most of the time it holds. When it doesn't, the wipe shoe keeps the metal from flying.

Relax — After being stretched around the die, the part is held

Wraparound begins. While the pivoted tension head holds the metal tangential to the die, the die rotates and the wipe shoe irons the metal against it

in full tension for several minutes to let it "set." When the tension is gradually released, the metal protests with pops and groans. It's probably only friction on the die, but it doesn't occur with other metals. Any shrinkage is minor. The relaxed metal fits the die.

There's little springback. Hand pressure is enough to make the part conform to the gaging fixture.

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

IF IT'S TRUE that the customer is always right, future machine tools will have it over present models on four counts.

First, they will produce to closer tolerances. Second, they'll turn out more parts at lower unit costs. Third, they will be both rugged and easy to maintain. Fourth, they will require an investment that's related to the work they'll do and to the cost of labor to run them.

Speaking at the spring meeting of the National Machine Tool Builders' Association in Chicago a week ago, Roger J. Emmert cited the above four over-all areas for improvement in machine tool design and performance.

From these, Mr. Emmert, executive in charge of the facilities and processes staff, General Motors Corp., got down to brass tacks. He reported that a recently completed survey of General Motors' master mechanics turned up the following.

Drilling Machines — Reduced maintenance was called for in 34 per cent of the returns; 27 per cent wanted better accuracy; 21 per cent called for greater flexibility and operating ease; and 9 per cent wanted better safety provisions.

The master mechanics also asked for more rigidity, more positive depth control and better spindle lubrication. They also wanted a standard spindle nose.

Milling Machines — Here they listed nine points for improvement: Greater rigidity and strength, centralized lubrication, better chip disposal, larger spindle nose, higher spindle speeds, greater spindle horsepower, better drives to reduce chatter, chip protection on moving parts, bearings and ways and the elimination of lubrication leaks.

They also asked for uniform location of T-slots on tables.

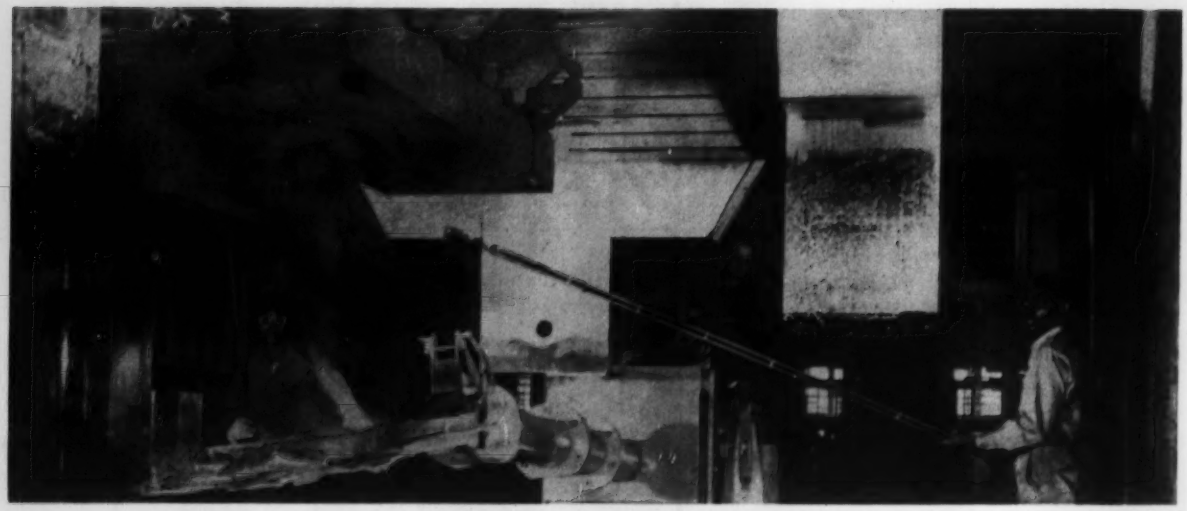
Turning Equipment—Here are the improvements GM's master mechanics want to be incorporated in the equipment that does their turning: More power, speed and rigidity, better chip handling systems, better methods of applying coolant and improved alignment of indexing mechanisms and turrets.

That, then, is what GM figures it will want in production equipment of the future. Interestingly enough, (it may be more than coincidence) their wants pretty well sum up the major trends in machine tool design.

Right, but Wrong

Two weeks ago STEEL reported some figures as quoted from Arthur S. Flemming, director of the Office of Defense Mobilization. They were supposed to show that the 1 per cent per month rental rate formerly charged by the government for its machine tools was comparable to commercial practice.

The quote was accurate, but the impression was wrong. Government leasing has been conducted at rates substantially below commercial ones. That's the sore point—it puts the government in competition with both commercial machine tool leasing and machine tool selling.



Lubricant is applied with long spray pipe to die for forging wing spar as . . .

Heavy Presses Go To Work

THE LARGE flying forging was cleared for take-off when the Air Force dedicated its heavy press plant at the Cleveland Works of Aluminum Co. of America, May 5.

It's the first complete facility of the Heavy Press Program (see table) to get into operation. (Wyman - Gordon, North Grafton, Mass., dedicated its 35,000-ton unit last month. Its 50,000-ton press will be ready this fall.)

Dominating the 12-acre plant are two hydraulic presses which cost $40 million—a 50,000-ton Mesta and a 35,000-ton United. They are ready to squeeze out precision forgings that will mean stronger, lighter and cheaper components for modern aircraft.

Economy—The large size of the forgings allows one-piece construction of airframe parts formerly made in several pieces.

Nonmilitary products are in the picture, too. Alcoa's president, I. W. Wilson said: "We hope to develop civilian products that can be made when military production is not filling press capacity."

There's Room — Air Force spokesmen said there's open capacity on the presses now. Barring all-out emergency, there should be continuing capacity for some nonmilitary production.

Education — Use of the large forgings is expected to lag behind the ability to produce. You can't design parts for the production line until you are sure you can get them.

Forgings being turned out by the big presses probably could be made by presses half as big. As designers gain experience and confidence in the large forgings, they will call for parts that will require the full tonnage of the big squeeze.

Heavy Press Program Brought Up To Date

FORGING PRESSES

Operator	Location	Builder	Press Tons	Operational Date
Wyman-Gordon	N. Grafton, Mass.	Loewy	50,000	Aug. or Sept., 1955
Wyman-Gordon	N. Grafton, Mass.	Loewy	35,000	Spring of 1955
Alcoa	Cleveland	Mesta	50,000	May, 1955
Alcoa	Cleveland	United Engineering	35,000	May, 1955

EXTRUSION PRESSES

Alcoa	Lafayette, Ind.	Schloeman	14,000	May, 1954
Kaiser	Halethorpe, Md.	Loewy	8,000	Sept., 1955
Kaiser	Halethorpe, Md.	Loewy	8,000	Sept., 1955
Harvey	Torrance, Calif.	Lombard	12,000	Oct. or Nov., 1955
Harvey	Torrance, Calif.	Loewy	8,000	Oct. or Nov., 1955
Curtiss-Wright	Buffalo	Loewy	12,000	May, 1955

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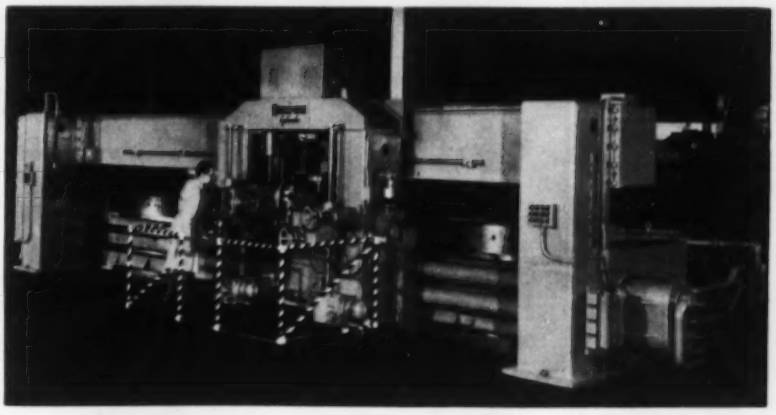
A minimum of headroom is required as this Alliance crane utilizes a special telescopic ram rather than a rack type ram to conserve overhead space. And, because of the compact design, this type crane can be installed where the rack type could not because it requires more headroom. The operator is located on the gantry leg level with his work for perfect visibility.

Alliance, with more than a half-century of crane building experience behind them, is continually developing new ways to give industry added lifting power at reduced costs. Call in your Alliance engineer today for a frank discussion of your heavy material handling problems. Be prepared now and tomorrow.

Plate Edge Planer Features Reciprocating Saddle

A new concept in plate planing is made possible by a hydraulic planer whose saddle assembly moves over the work while the bed remains stationary.

The machine has a 14-ft stroke and takes work up to 14 ft wide x 7 in. thick. Attached to vertical columns at either end of the bed is a work clamp overarm containing hydraulic cylinders to operate four work clamp shoes. The saddle is mounted on two vertical ways which are part of the bed.



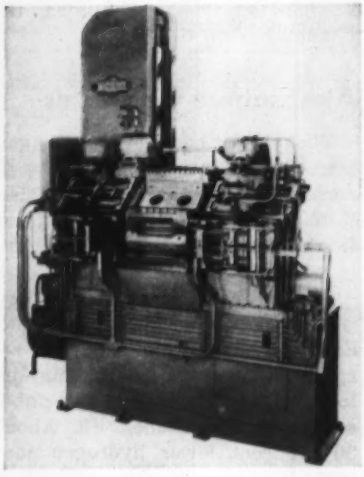
The saddle reciprocates from 10 to 200 fpm. Right and left side rails, joined by a welded steel column top, carry the cutting tools. Mounted on the back of the saddle assembly are two double-end, hydraulic cylinders which move with the saddle while the cylinder rods remain stationary with the bed and vertical columns.

A dual control system enables the operator to control most saddle movement and all head movement from a stationary pendant or from a movable pendant on the platform of the saddle. Both side head rails are equipped with handwheel-operated work locators. Conventional planer tools or sintered carbide ones can be used.

Each of the two hydraulically counterbalanced side heads has a hydraulic tool lifter. Head feed is hydraulic, and electric rapid traverse is available for any direction. A triple circuit permits three speed ranges and three force ranges. Any speed range may be selected and adjusted to a direct reading tachometer by pushbutton control.

A saddle hydraulic system is built into the column top which is mounted on the two side rails. It includes motor, pump and necessary valving to operate the two heads. It needs only an electric power source to operate and is separate from the main hydraulic drive unit. *Write* Rockford Machine Tool Co., Dept. W, Rockford, Ill. *Phone*: Rockford 3-7611

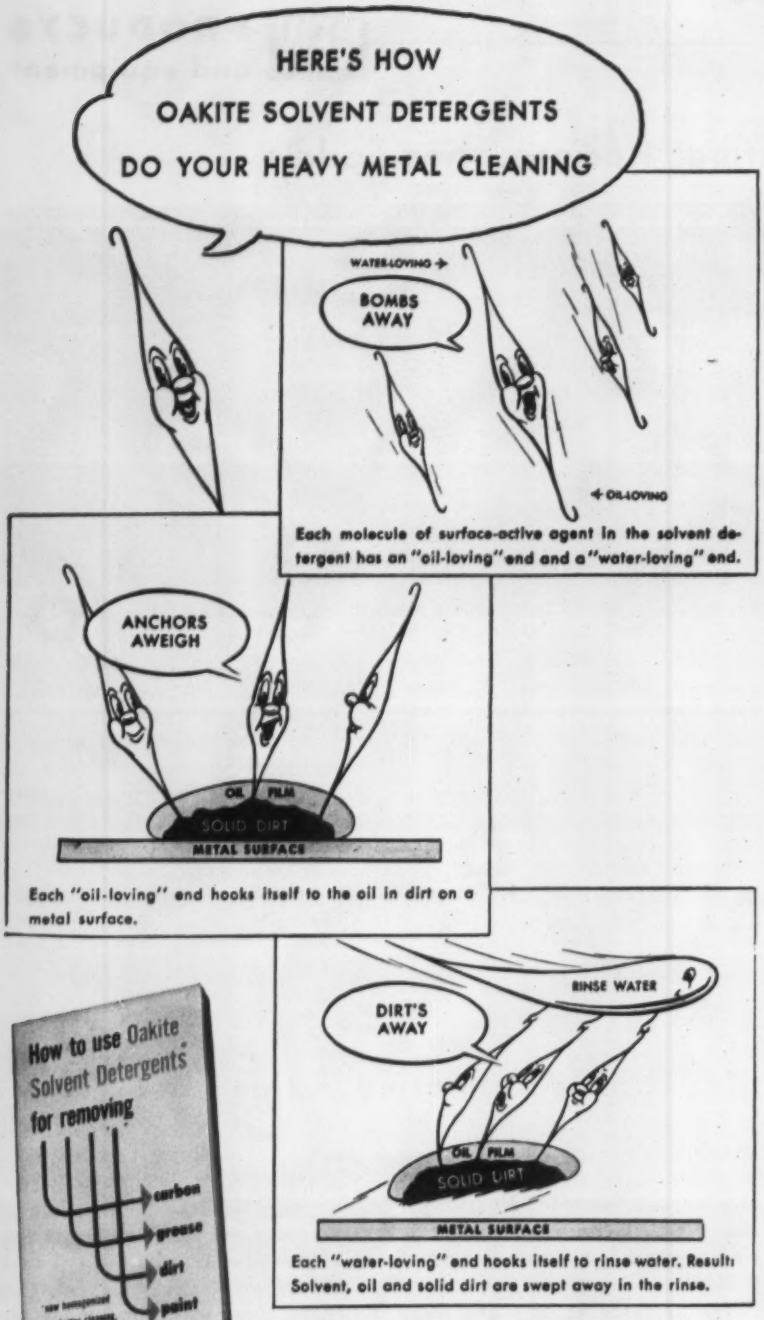
Unit Broaches and Center Drills Automotive Axles



This broaching and centering machine is equipped with four, two-station fixtures equally spaced on an indexing trunnion which operates on an eight-index arrangement. Two axles are broached to length while two parts are center drilled.

The operator unloads and loads two axles at the front of the machine as the parts rotate past. Axles are automatically clamped and indexed 45 degrees to an intermediate station. This allows parts already broached to swing clear at the back station so the broach can be returned to starting position. Parts previously drilled also unclamp as they rotate to an intermediate station. When the broach has returned to the starting position, the trunnion indexes another 45 degrees to present two parts for broaching, two for drilling and two for unloading.

Tooling includes fixtures which hold two parts each and locate and clamp with equalizing jaws at both ends. Indexing mechanism is of the Geneva type, with final index obtained by a shock pin. Centering unit consists of two, two-spindle units mounted on top of the trunnion support on either side of the fixture, and electrically interlocked to the cycle. Parts are broached by surface cutters. The machine also has a motor-driven chip conveyor unit. It is designed for pit mounting, with the operator working at floor level. *Write* American Broach & Machine Co., American Bldg., Ann Arbor, Mich. *Phone*: Normandy 2-5621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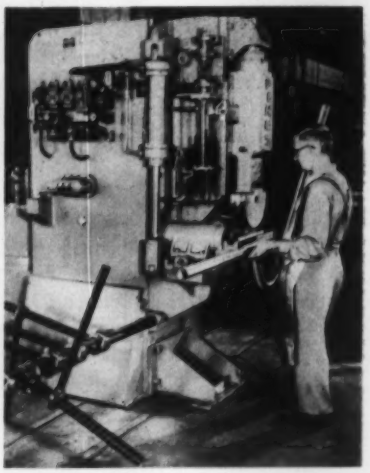
This hydraulic, self-contained unit will produce up to 1400 bends an hour without excessive flattening, wrinkling or distortion. It can handle ½ through 2 in. OD steel tubing with a maximum wall thickness of 0.083 in. Clearance is provided to bend a 2-in. tube with a 5-in. centerline radius to 180 degrees.



Six new design features are incorporated: 1. One-piece, C-frame casting. 2. Cast steel ram and built-in ram cylinder. 3. Accurate angle-of-bend control. 4. Improved wing die operation. 5. New, manifold-type valves. 6. Adjustable return stroke. *Write* Pines Engineering Co. Inc., Aurora, Ill. *Phone*: Aurora 6-7701

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The Exo-Endo produces gas atmospheres between the limits of perfect combustion and modified "302." Requiring only 20 sq ft of floor space, it can be used effectively with all types of furnaces.

At the "302" setting, the gas generated differs from the standard, AGA-type 302 in two respects: 1. Lower dew points—as low as −50° F, with no detectable amounts of methane. 2. About 50 per cent lower hydrogen content.

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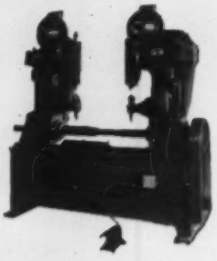

DOUBLE RIVITOR sets two rivets at a time! Equipped with 10" hoppers, and tooled to automatically feed and set two ¼" dia. x ⅝" long wagon box head rivets at a time in elevator chain and raddle or elevator flight assemblies for farm implements. Controlled by one foot pedal.

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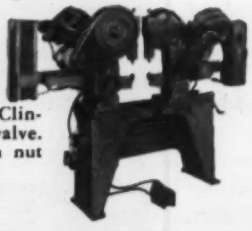

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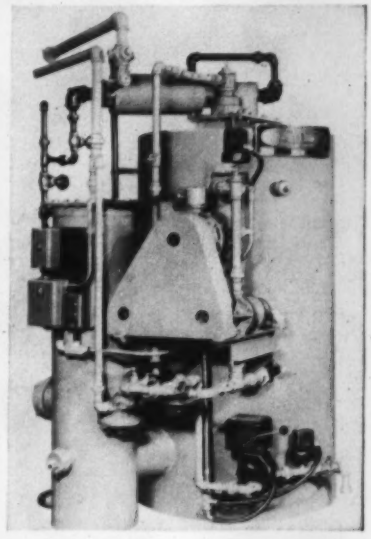
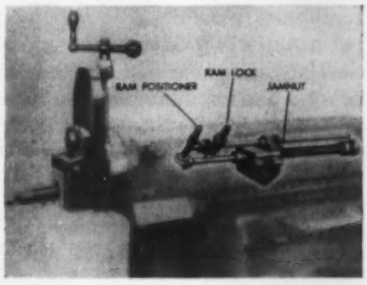


well as hardening, annealing and tempering of nonferrous alloys. *Write* Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich. *Phone*: Tyler 4-5700

Solid Top Shaper Rams

On this line of tool room and industrial shapers the slot has been eliminated and the ram reinforced with longitudinal and crossribbing. Deflection is reduced to a minimum.

The ram lock is adjacent to the ram positioner for convenient operation. The same handle is used for positioning and locking the ram. The lock, operating on the screw-and-jamnut principle, elimi-



nates ram distortion. Cutting forces are transmitted directly by the enlarged positioning screw. *Write* Gould & Eberhardt Inc., Irvington 11, N. J. *Phone*: Essex 3-7300

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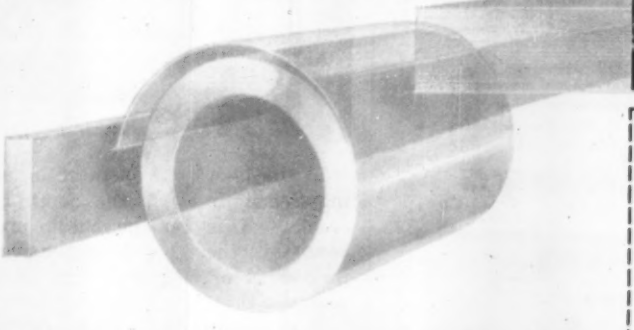

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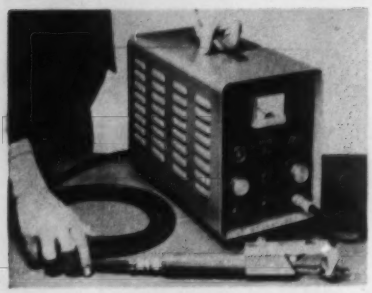
Nondestructive Tester Measures Depths of Cracks



Detecting a crack in iron or steel is not always sufficient; its depth may be just as important. A portable electronic instrument, the Sedac SE-100, does both. It will detect and measure depths of cracks from 0.012 to 0.120 in. deep.

Sedac's most important application will be in salvage work where defects of a certain size are allowable (as in steel mills, certain foundry operations and some forging shops).

Chipping to determine the seriousness of the defect is eliminated. Sedac can be used with any inspection method which detects surface cracks. Where the minimum allowable crack depth is known, it can be used for combined measuring and detecting operations.

It can be operated as a completely automatic testing unit when only seams deeper than the preselected minimum are to be found. By attaching appropriate circuits, parts can be inspected, rejected or marked automatically.

Operation of the unit depends upon relative motion between the probe and the test piece. The probe contains a sapphire-protected, gimbal-mounted search coil and is on a 10-ft cable. The probe must be kept in physical contact with the part. Direction of scan is at right angles to suspected cracks.

When the probe crosses a crack, signal lights flash in the handle and on the face of the instrument. A third light remains on until the unit is reset by an inspector.

Comparative crack depth measurements are made by presetting the instrument to desired sensitivity. A test block with cracks of given depths is provided, but any known sample can be used.

In the photo, an operator is using Sedac to check the depth of cracks. This salvage check prevents further (and expensive) processing of bars that have deep seams in them.

The testing unit weighs 20 lb. It operates on 115-volt, 60-cycle supply. *Write* Magnaflux Corp., 7300 Lawrence Ave., Chicago 31, Ill. *Phone*: Underhill 7-8000

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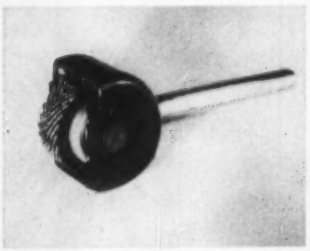
Ball-Bearing Wheel Dresser

Seventeen, 16-gage cutter discs give this dresser about 30 per cent more width than conventional models. Outside diameter is 2⅝-in. Each cutter has 29 teeth, which are ⅜-in. long.

The bearing is of the Neoprene-sealed type, mounted so the sealed side is exposed. Bearing preload is set when dressers are assembled.

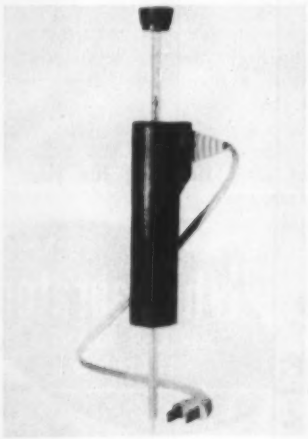
Dressers can be furnished with spacers where a grinding application requires opening a wheel farther for more freeness of cutting action. Holders for the spindle units are available for any type



grinder. Illustrated is the unit with a universal holder. *Write* Aer-O-Matic Tool Co., 5059 W. Diversey, Chicago 39, Ill. *Phone*: Berkshire 7-6170

Coating Thickness Tester

Improvements in design and utility of the Lea Lectromag include: 1. Calibration with National Bureau of Standards thickness samples. 2. Plug attachment at side rather than top, providing better visibility of the indicator, sturdier construction and easier manipulation of the tube assembly. 3. Knurled rather than smooth top on the glass tube assembly, providing a better grip for manipulating the glass tube. 4. New compact instrument case with calibration chart for easy calculation.



The instrument has a thickness testing range from 0.0002 to 0.008 in. Accuracies: ±15 per cent on thicknesses under 0.001 in. and ±10 per cent on thicknesses over 0.001 in. The unit operates on 110-115 volts, ac, 60 cycles, with a voltage variation compensating feature. *Write* Lea Mfg. Co., Waterbury, Conn. *Phone*: Plaza 3-5116

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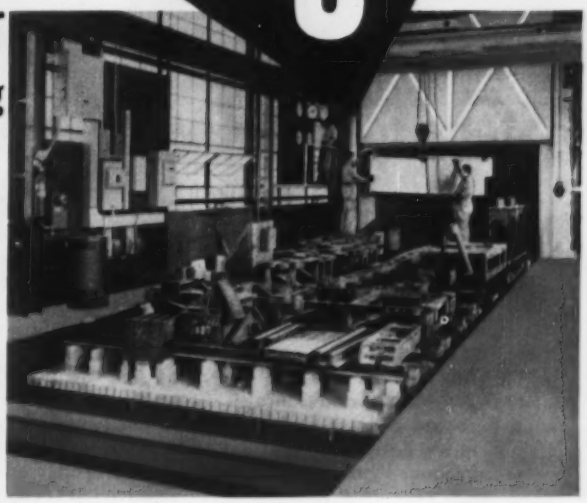

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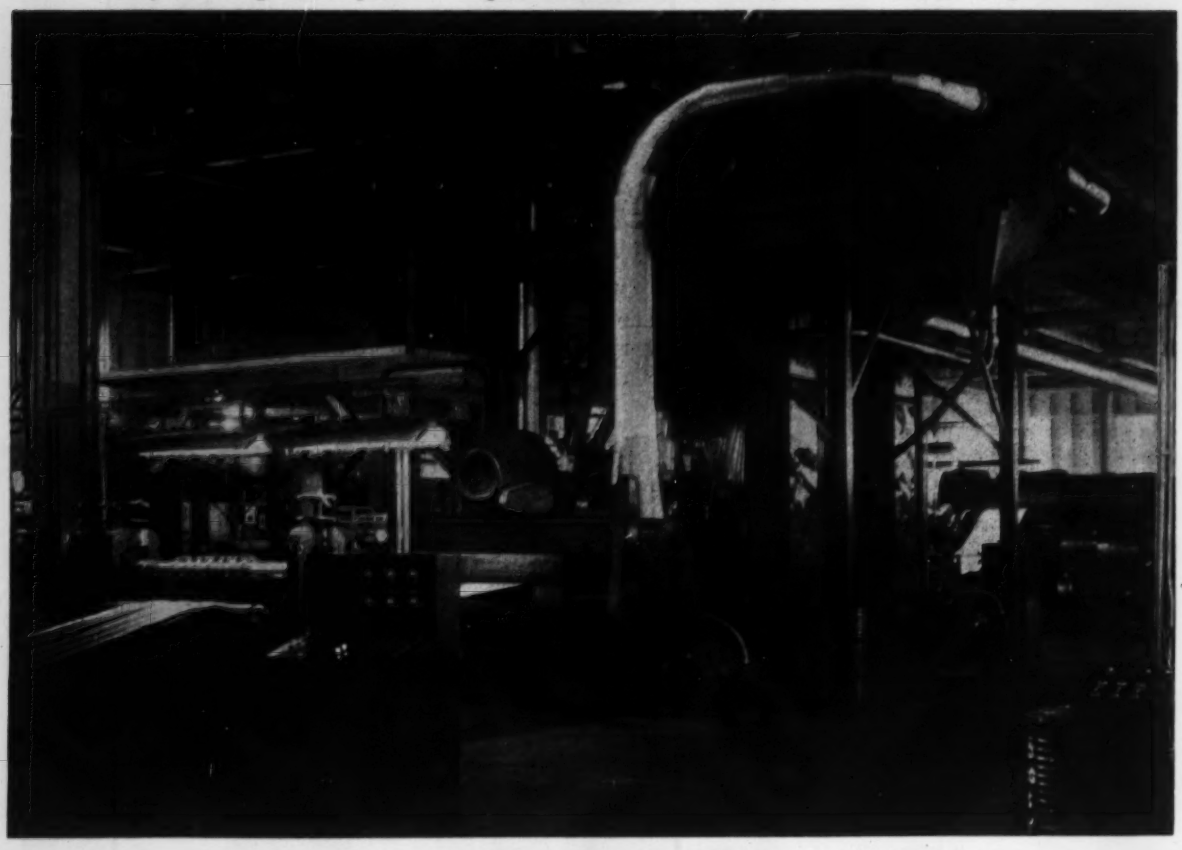

8 Steps to Low Cost Cleaning of Steel Mill Products

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2. Slab and Billet Conditioning
3. Continuous Strip Descaling
4. Sheet Descaling
5. Bar Stock Descaling
6. Wire Rod Descaling
7. Steel Shapes Descaling
8. Etching Mill Rolls

New developments in Airless Wheelabrator blast equipment and abrasives have eliminated all past objections to blast cleaning with an attendant reduction in costs. These have been proved lower than present pickling costs by the many Wheelabrator installations on all types of steel products.

With the Wheelabrator, scale is uniformly and economically removed leaving a surface ideal for cold rolling, cold forming, cold drawing and final finishing such as galvanizing or painting. By eliminating completely or partially the use of acid pickling, the Wheelabrator can equal or better your present costs without any virgin metal loss and with complete recovery of all scale as well as the abrasives used in its removal. Acid disposal problems are eliminated.

These impressive savings are being effected for steel producers and fabricators alike. Rome Cable Corp., for example, selected Wheelabrating for descaling steel strip because it was the only process that would remove surface scale economically and permit the rest of the plant to maintain its high production without requiring a major portion of its plant area.

Write today for complete information on this modern method of steel finishing for your problem.

Bulletin 894 describes the descaling of Steel Strip and Bulletin 914 describes the descaling of steel sheets. Send for your copies today.

American

WHEELABRATOR & EQUIPMENT CORP.

509 S. Byrkit St., Mishawaka, Ind.

Wheelabrator
AIRLESS BLAST CLEANING

NEW PRODUCTS and equipment

Round Lead Anodes for Chromium Plating

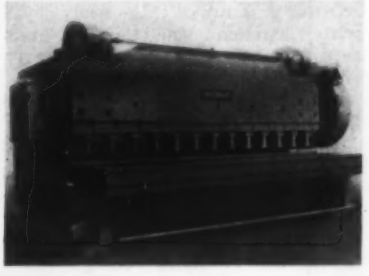
Designed to give better current distribution over their entire area, these anodes permit faster plating, better chromium coverage and the use of higher current densities.

Of a lead-tin alloy, the anode is extruded to provide a dense nonporous structure. Its heavy cross section enables it to withstand high current density without overheating or warping. Insulated hooks are homogeneously lead burned to the anode to insure positive contact.

Anodes are available in 1½ or 2-in. diameters and in lengths from 12 to 50 in. *Write* Hanson-Van Winkle-Munning Co., Church St., Matawan, N. J. *Phone:* Matawan 1-1000

Corrugated Metal Shear

Operating at 20 strokes a minute, this 100-series machine shears corrugated mild steel sheets 12 ft long. Its table top is recessed to permit proper seating of the stock. Thirteen hydraulic hold-down plungers are beveled at a 45-degree angle to allow clearance of corrugations when shearing.



Additional features include a light beam shearing gage, two T-slots in the front edge of the table and a slitting adjustment for shearing longer sheets than the shear can accommodate in one operation. *Write* Cincinnati Shaper Co., Hopple, Garrard & Elam Sts., Cincinnati 25, O. *Phone*: Kirby 5010

Twin Disc Power Take-Offs are available with clutches ranging from 6.5" to 24" single-plate; from 11.5" to 24" double-plate. Housing sizes No. 6 SAE to No. 00 SAE. Capacities up to 600 hp. Write for Bulletin No. 129-C.

Next time you're watching powered equipment driving through a friction power take-off, check the name plate on the drive back of the engine. In all probability, you'll see a Twin Disc Power Take-Off, putting *more horsepower to work.* With their simple, *rugged* design—single-point adjustment—and slippage capacity far in *excess* of horsepower rating, *Twin Disc Power Take-Offs are selected as standard equipment by most of the nation's leading industrial engine manufacturers.*

That's why you'll find Twin Disc Power Take-Offs on such leading industrial engines as Ajax - Buda - Caterpillar - Climax - Continental - Cummins - Hercules - International - LeRoi - Minneapolis-Moline - Murphy - Superior - Waukesha - White - Wisconsin . . . for these manufacturers know they can depend on Twin Disc performance . . . and they know, too, that wherever their engines may be ultimately working, Twin Disc Service will only be a matter of hours . . . backed by 60 Parts Stations and 8 Factory Branches or Sales Eng. Offices.

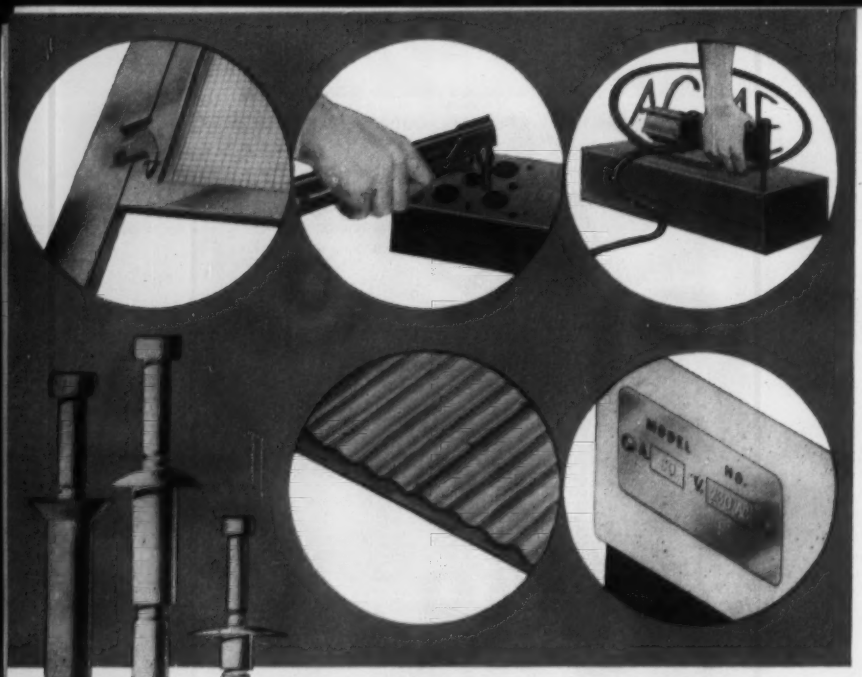
TWIN DISC

TWIN DISC

Friction Clutches and Fluid Drives

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Seattle • Tulsa



You Speed Assembly— Reduce Costs... with Townsend Blind Rivets

In a split second, one man can install this tamper-proof, vibration-resistant blind rivet to give you secure fastening in many applications that otherwise would be slow and expensive.

Townsend blind rivets are installed by one man from one side of the work and are used extensively in blind and limited clearance operations. They provide high clinch and a strong fastening method for a wide variety of products.

These rivets are ideal for installation of name plates and serial numbers on appliances and similar units which must retain their original identity permanently. Radio and television components are assembled quickly with Townsend blind rivets. Awnings, jalousies, screens, storm doors and windows are fabricated with ease in the shop or in the field when Townsend blind rivets are used. The illustrations above are but a few representative items where these ingenious rivets are used to keep unit costs down by saving time.

For information, write for Bulletin TL-99 or use the coupon below.

THE FASTENING AUTHORITY

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Chery Rivet Division - Santa Ana, California

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

TOWNSEND COMPANY
Sales Department
New Brighton, Pa.

Please send without obligation Townsend Blind Rivet Bulletin TL-99.

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____

NEW Literature

Write directly to the company for a copy

Small Plant Automation

Typical examples of standard, transfer and special machines equipped with automatic loading and unloading mechanisms are given in "Opportunities Through Automation" —20 pages. Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.

Welding Equipment

Here is a 1955 catalog of equipment and supplies for gas and electric welding. One section is devoted to industrial safety equipment—catalog H, 84 pages. Burdett Oxygen Co., Dept. K, 3300 Lakeside Ave., Cleveland 14, O.

Leaded Alloy Steel

New Rycut 50 alloy steel is said to cut 25 to 75 per cent faster than conventional 0.50 carbon alloy steel. It has comparable mechanical properties—bulletin 14-6, 4 pages. Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill.

Pneumatic Tools

The complete line of Air Impactools, specifications and equipment furnished with each tool are illustrated in this catalog. On-the-job applications and case histories are given—form 5200-A, 52 pages. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Die Casting Standards

Created to help designers and engineers avoid overspecification, the first five of a series of "Product Standards for Die Castings" are available from job die casters who are members of ADCI. For a list of those nearest you write American Die Casting Institute, 366 Madison Ave., New York 17, N. Y.

Electrical Conduit

Here is a fact-packed, reference data book on the use of rigid steel conduit and electrical metallic tubing —24 pages. Sales Control Center, Pittsburgh Standard Conduit Co., 61 Bridge St., Pittsburgh 23, Pa.

Austenitic Alloy

Allegheny Ludlum's A-286 alloy has high strength up to 1300° F. Here is a folder containing corrosion and oxidation resistance data, application and heat-treating information, plus physical and mechanical properties — 4 pages. Advertising Dept., Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

MONEL • NICKEL • COPPER • ALLOYS
THIN STRIP

±.0004" is run-of-the-mill

Typical of the care that assures absolute uniformity in all Somers THIN STRIP is this 4-high mill equipped with the latest electronic gages and controls. Here thickness is constantly checked throughout the run, and maintained within ±.0004" or less on gages from .010" down. The slightest variation may be instantly corrected.

No matter how exacting your requirements may be for thin strip metal, you can depend on Somers quality control, equipment and experience to guarantee uniform quality every time—all the time.

Somers Brass Company specializes in rolling nickel and its alloys from .020", and copper and its alloys from .012" both down to .00075".

If you now have, or anticipate, a problem with exacting standards of this strip metal write:

FOR EXACTING STANDARDS ONLY
Somers

Somers Brass Company, Inc.
WATERBURY, CONN.

Plant Layout Models

Here is a 1955-56 price list and a catalog of plant layout equipment. Projects are estimated two ways: Complete jobs are charged on a square-foot basis; currently stocked ¼-in. scale models are individually priced—62 pages. Visual Plant Layouts Inc., Pennsylvania Ave. at River, Oakmont, Pa.

Fire Hood

It protects the head, neck and shoulders against extreme heat. The cape is of aluminized glass cloth, with a neoprene vapor barrier and wool insulation. Hat and side shields are aluminum—bulletin 1301-4. Mine Safety Appliances Co., 210 N. Braddock Ave., Pittsburgh 8, Pa.

Corrosion Prevention

"The Proven Method of Rust Prevention" explains how vapor phase inhibitor papers halt rusting on ferrous metals and aluminum. Packaging requirements and protective life expectancy are given—19 pages. Angier Corp., Framingham, Mass.

Lathes

The series 90, Dyna-Shift is discussed in detail. Information is supplied on its simplicity of operation which is made possible by a new headstock drive—bulletin 1601, 26 pages. Monarch Machine Tool Co., Sidney, O.

Grinding

"A Modern Perspective of the Grinding Process" is offered—7 pages. Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh 13, Pa.

Diesel Power Units

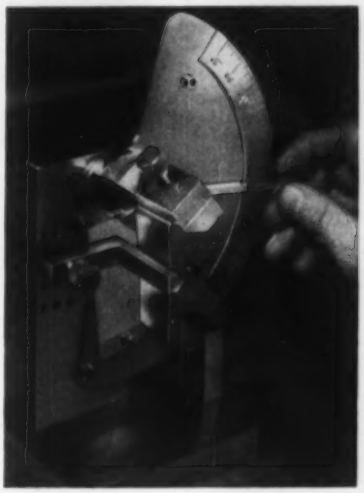
Need a heavy-duty diesel engine? Two types (S and SS) are described. Horsepower ranges from 375 to 1000. Information on the lubrication, cooling and fuel injection systems is included—Form 10,040, 20 pages. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Gamma Radiography

Here's basic information on how to set up and operate a gamma radiography installation. Selection of the proper radioisotope for handling equipment and the principles of radiation safety are covered. Tables and charts show characteristics, radiographic sensitivity and speed of isotopes—12 pages. Technical Operations Inc., 6 Schouler Court, Arlington, Mass.

MONEL • NICKEL • COPPER • ALLOYS
THIN STRIP

no standard is too exacting



Temper requirements for the thin nickel strip (.002") used in sensitive electronic tubes were too exacting to be checked by the usual methods. So Somers carefully hand checks several samples from each lot by the ultra-precise "bend test" illustrated above.

Since 1910 Somers Brass Company has specialized in producing thin strip: nickel and its alloys below .020" and copper and its alloys below .012" with the tensile properties, fatigue resistance, drawing properties and many other requirements which only the most exacting standards of production and quality control can meet.

Whatever your specifications may be, why not take advantage of Somers long experience? Write for field engineer or Confidential Data Blank for a complete survey of your problem at no cost or obligation.

FOR EXACTING STANDARDS ONLY
Somers

Somers Brass Company, Inc.
WATERBURY, CONN.

Why Moly alloy steels are in your future

Photo courtesy of Bausch & Lomb Optical Co.

DIE LIFE INCREASED 6 TIMES

with

Moly tool steels

the part	**STRIKING DIES**
the problem	When made from a carbon tool steel with 1% C, striking dies for stamping gold-filled spectacle temples would break after about 15,000 pieces.
the pay-off	The Bausch & Lomb Optical Company increased production to 100,000 pieces by changing to a low-alloy tool steel with about 0.5% C, 1% Si and 0.5% Mo. The difference in cost of the finished dies was negligible but the use of this alloy steel eliminated 85 to 95% of the breakage and also reduced polishing time.

If you make, use, specify or buy steels you need a copy of "ALLOY STEELS PAY OFF"

Such topics as:

Air valve stems on coal washers, anchor chain, annealing retorts, ball cages in universal joints, band saws, bolts, boring cars, bridges, bumpers for passenger cars, cable-tool and churn-drill bits, caustic evaporators, central-station feed pumps.

This big, fully documented, 208-page book gives 60 complete case histories highlighting the many advantages of alloy steel usage . . . such as outlined above. And each case history is an idea-starter of its own! Get your copy today. Address Dept. 3, on your letterhead, please. *Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y.*

MS5-6

CLIMAX MOLYBDENUM

STEEL
May 16, 1955

Market Outlook

DON'T BE SURPRISED if steel demand soon eases a little.

Users have been building steel inventories for the last two and a half months. This is detected from the American Iron & Steel Institute's report on mill shipments of finished steel in March. Shipments that month were 7,268,795 net tons, the second highest monthly outturn in history. STEEL calculates March consumption was 6,578,000 net tons, leaving 690,800 tons to go into inventory. This is the first time since May, 1953, that consumers have put steel into inventory. But you have to go back to March, 1952, to find a month in which more steel was put into inventory than in March of this year.

BUILD-UP—It's a good bet that inventory building of steel has continued since March. Steel ingot output in April declined only 1.7 per cent from that of March, while the biggest user—the automobile industry—lowered its production 1.9 per cent despite some record-breaking output at the end of April.

TURNING POINT?—During the first two weeks of May, steel ingot production was higher than in March or April: It was at a new record. But auto output in the first week of May eased down 4 per cent from the preceding week's record rate, and there are the first faint signs of a softening in auto sales.

BIGGER YIELDS—There's every reason to believe mill shipments of finished steel continued in April and up to now at the high rate of March. Mills have built up their stocks in process and can ship a high percentage of their ingot output as finished steel. In March, finished steel shipments were 73 per cent of ingot output. Until then, ingot output had been going up, but finished steel shipments were not rising proportionately. February's mill shipments of finished steel were 72 per cent of ingot output. In January, while the steel industry was building up working stocks of semifinished steel, the ratio of finished steel to ingots was only 68 per cent.

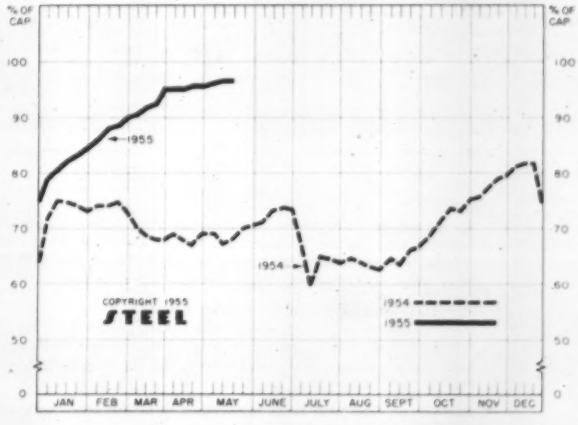
IN LINE—There's nothing alarming about the amount of steel inventories that have been built since Mar. 1. The tonnage is not top heavy. And at our high rate of steel consumption and demand, we need some inventories. But there isn't the inclination to lay in inventories so large as those needed during a shooting war. Also, a possible price rise in steel is no longer an incentive to buy in excess of needs. By the time you can get delivery on orders placed now, the price probably will have gone up, if there is to be an increase.

A GOOD BET—So it's reasonable to believe demand for steel—particularly the light, flat-rolled products—will become a little less intense before long. The steel business could ease and still be high.

No one expects the bottom to fall out of the steel business. There's increasing belief steel demand won't drop so low as was estimated earlier, for business in general has strengthened.

RECORD PACE—Steel ingot production now is probably as high as it will go. For the second consecutive week it was at the new record pace of 2,328,800 net tons. To make this tonnage, mills operated at 96.5 per cent of capacity in the week ended May 15.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended May 15	Change	Same Week 1954	Same Week 1953
Pittsburgh	99	— 0.5*	71	97.5
Chicago	99.5	+ 0.5	83	106.5
Mid-Atlantic	96.5	0	56	97.5
Youngstown	98	0	68	105
Wheeling	95.5	0	84	101
Cleveland	101.5	+ 1	78.5	101
Buffalo	104.5	0	67.5	106.5
Birmingham	93.5	0	56.5	102
New England	88	0	50	93
Cincinnati	89.5	— 4	59.5	97
St. Louis	106	— 0.5	72.5	92
Detroit	88.5	— 3	64.5	114.5
Western	100	+ 4*	56	110
National Rate	96.5	0	68	100.5

INGOT PRODUCTION‡

	Week Ended May 15	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	145.3†	145.1	142.2	105.2
NET TONS (In thousands)	2,334†	2,331	2,284	1,690

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1956; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 57 Technical Outlook—p. 115

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	May 10 1955	May 3 1955	Month Ago	Apr. Average
(1947-1949=100)	144.8	144.8	144.8	144.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended May 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.525
Rails, Light, 40 lb	5.917
Tie Plates	5.275
Axles, Railway	7.500
Wheels, Freight Car, 33 in. (per wheel)	48.500
Plates, Carbon	4.675
Structural Shapes	4.517
Bars, Tool Steel, Carbon (lb)	0.430
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.525
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.115
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.610
Bars, H.R., Alloy	8.875
Bars, H.R., Stainless, 303 (lb)	0.423
Bars, H.R., Carbon	5.000
Bars, Reinforcing	4.963
Bars, C.F., Carbon	8.160
Bars, C.F., Alloy	11.375
Bars, C.F., Stainless, 302 (lb)	0.438
Sheets, H.R., Carbon	4.870
Sheets, C.R., Carbon	5.864
Sheets, Galvanized	7.220
Sheets, C.R., Stainless, 302 (lb)	0.553
Sheets, Electrical	$9.350
Strip, C.R., Carbon	7.493
Strip, C.R., Stainless, 430 (lb)	0.415
Strip, H.R., Carbon	5.075
Pipe, Black, Buttweld (100 ft)	15.000
Pipe, Galv., Buttweld (100 ft)	18.605
Pipe, Line (100 ft)	146.804
Casing, Oil Well, Carbon (100 ft)	154.216
Casing, Oil Well, Alloy (100 ft)	227.875
Tubes, Boiler (100 ft)	‡
Tubing, Mechanical, Carbon	‡
Tubing, Mechanical, Stainless, 304 (100 ft)	167.023*
Tin Plate, Hot-dipped, 1.25 lb	8.533
Tin Plate, Electrolytic, 0.25 lb	7.233
Black Plate, Canmaking Quality	6.333
Wire, Drawn, Carbon	8.075
Wire, Drawn, Stainless, 430 (lb)	0.545
Bale Ties (bundle)	5.860
Nails, Wire, 8d Common	7.815
Wire, Barbed (80-rod spool)	7.127
Woven Wire Fence (20-rod roll)	16.925

‡Not available. *Not comparable with previous figure.

STEEL's FINISHED STEEL PRICE INDEX*

	May 11 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 avg.=100)	194.53	194.53	194.53	189.74	156.13
Index in cents per lb	5.270	5.270	5.270	5.140	4.230

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$118.45	$118.45	$118.45	$113.70	$93.23
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.47
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.97
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	34.83	35.33	37.41	27.67	31.67

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	May 11 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.45
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.45
Bars, H.R., deld. Philadelphia	4.55	4.55	4.55	4.405	3.93
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	4.10-4.15
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.40
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.40
Shapes, deld. Philadelphia	4.53	4.53	4.53	4.38	3.42
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.50
Plates, Chicago	4.225	4.225	4.225	4.10	3.50
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.10	3.60
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.50
Plates, Claymont, Del.	4.225	4.225	4.225	4.10	3.60
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.35
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.35
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.30
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pittsburgh	4.05	4.05	4.05	4.425	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45	4.15
Strip, C.R., Chicago	5.85	5.85	5.85	5.70	4.30
Strip, C.R., Detroit	5.90	5.90	5.90	5.65	4.35-.40
Wire, Basic, Pittsburgh	5.75	5.75	5.75	5.525	4.50
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.55	5.30
Tin Plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$63.00
Wire Rods, ⅜-⅝" Pitts.	4.675	4.675	4.675	4.525	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	59.66	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	55.16	55.16	55.16	60.16	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	42.38
No. 2 Fdry (Birm.) deld. Cin.	60.58	60.58	60.58	60.43	49.08
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$34.50	$35.50	$38.50	$29.50	$36.00
No. 1 Heavy Melt, E. Pa.	36.00	36.50	37.75	23.00	28.50
No. 1 Heavy Melt, Chicago	34.00	34.00	36.00	30.50	30.50
No. 1 Heavy Melt, Valley	34.50	34.50	37.50	29.50	35.25
No. 1 Heavy Melt, Cleve.	31.50	31.50	35.00	28.50	31.75
No. 1 Heavy Melt, Buffalo	30.50	30.50	32.50	25.50	29.75
Rails, Rerolling, Chicago	52.50	52.50	52.50	42.00	48.50
No. 1 Cast, Chicago	40.50	40.50	41.50	38.50	42.50

COKE, Net Ton

Beehive, Furn, Connisvl.	$13.75	$13.75	$13.75	$14.75	$14.25
Beehive, Fdry, Connisvl.	16.75	16.75	16.75	16.75	16.00
Oven, Fdry, Chicago	24.50	24.50	24.50	24.50	21.00

Daily Nonferrous Price Record

	Price May 11	Last Change	Previous Price	Apr. Avg.	Mar. Avg.	May 1954 Avg.
Copper	36.00	Mar. 29, 1955	33.00	36.000	33.222	30.000
Lead	14.80	Oct. 4, 1954	14.55	14.800	14.800	13.800
Zinc	12.00	Apr. 6, 1955	11.50	11.927	11.500	10.290
Tin	91.375	May 11, 1955	91.125	91.458	87.194	93.600
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	23.20	Jan. 12, 1955	22.20	23.200	23.200	21.500
Magnesium	28.50	Mar. 21, 1955	27.00	28.500	27.556	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99+%, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

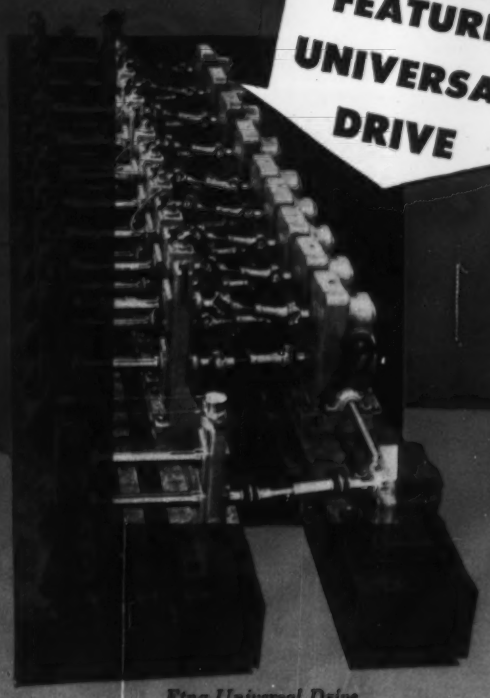
What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

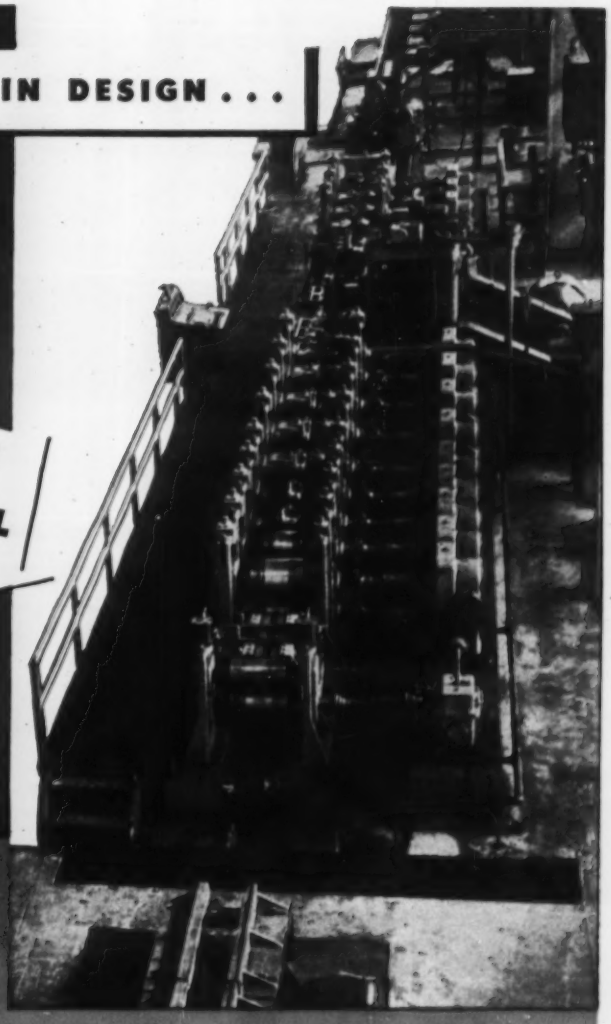
LEADING THE INDUSTRY IN DESIGN . . .

Etna TUBE MILLS

FEATURE UNIVERSAL DRIVE



Etna Universal Drive



You'll notice a trend toward Etna's modern machine design. Etna has sold more Universal Drive Mills than all other manufacturers combined. The Universal Drive provides greater accuracy in the forming of the tube, and allows an easier change from the manufacture of one diameter tube to another.

PERMANENT OIL COOLED TRANSFORMER

For greater efficiency an *Oil Cooled Transformer* is incorporated into the machine. It is a *permanent unit* and *never has to be replaced.* Cooling with oil eliminates the necessity to dry out the transformer after each days work, which is necessary when water is used as a transformer coolant. Etna Mills . . . Built for continuous operation. Write for complete details.

Abbey ETNA Company

3402 MAPLEWOOD AVE., TOLEDO 10, OHIO

Nonferrous Metals

Events in early May could be the forerunner of an easier tone in the copper industry by third quarter. But labor conditions in motordom and copper itself could upset things

Nonferrous Metal Prices, Pages 152 & 153

IF THE COPPER INDUSTRY doesn't settle down by the end of the third quarter, it won't be the fault of events in the first ten days of May. Here is what happened, all in favor of a more stable market:

The industry won a victory in Congress when the House of Representatives voted for a three-year extension of the suspension of import taxes on copper. Previous extensions had been for two years at the most. The Senate was expected to give its approval to the extension late last week. Other things being favorable, this action should assure domestic producers of increased imports over the next three years.

Better Deal, Amigos—Chile relaxed its tax and exchange regulations on foreign producers of copper. This will enable Anaconda Copper Mining Co. and Kennecott Copper Corp. to operate their facilities there more profitably. As a result, both companies have pledged themselves to expansions costing each about $2 million. This, too, should help increase imports of copper from Chile.

The Rhodesian Selective Trust group announced it will sell its copper for 35 cents a pound for the next 30 days. This is lower than had been anticipated, falling 1 cent under the domestic price. Inasmuch as this group supplies only about one-third of Great Britain's copper, there has been much speculation as to the effects of the announcement on the fluctuating London Metal Exchange. At presstime, that price was holding at an equivalent of 38 cents a pound, cash.

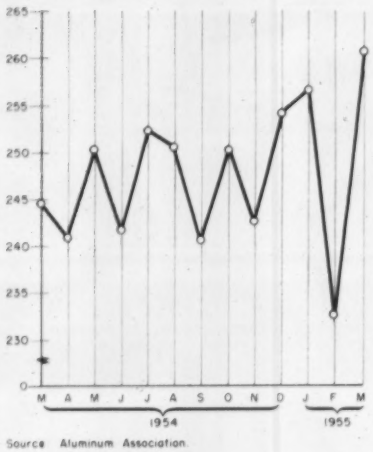
Natural Question—It is only natural that these events should start talk concerning a reduction in the domestic price of 36 cents. That level resulted from the pressure of an overpriced London market and the subsequent diversion of foreign metal from the U. S. Now that this pressure has subsided, it would not be surprising to see the domestic price of copper come down from its unnatural perch. But at presstime, there was no indication that this would happen in the near future.

The supply situation is unchanged. Whether it eases in the third quarter depends on the automotive industry and labor conditions at the time. If there is no strike in motordom, demand will be sustained right through the year, but not at current high levels. If there is a strike, a little more metal will be available to other users.

If It Isn't One Thing—Copper producers have to worry about their own labor problems, too. Contracts come up for renewal in midsummer, and some observers think the producers are going to have trouble explaining to labor's satisfaction the differential between last year's 30-cent price and the present price. It may mean substantial pay-increase demands, and it could end up in a strike in the copper mines.

Aluminum Hits New Peak

(primary production in millions of lb)



Source Aluminum Association

More Scrap for West Germany

The Bureau of Foreign Commerce has relaxed its copper scrap quotas for West Germany and has issued a supplemental copper alloy scrap quota (copper content, 3000 net tons) for the second quarter. West Germany was faced with unusual hardship after the U. S. restricted scrap exports in the first quarter. That country was almost solely dependent on American sources for this material and had been the largest importer of U. S. copper scrap. The supplemental quota is in addition to the second-quarter allotment (copper content, 7000 tons) for export to all countries except Canada. Export licenses for the supplemental amount will be issued on a historical basis.

Zinc Use Up, Stocks Down

One of the most favorable reports ever to come from the zinc industry confirms the feeling that was prevalent at last month's annual meeting of the American Zinc Institute: Business has rarely been better.

Shipments of slab zinc to domestic users reached a ten-year high in April —89,441 tons. This brisk civilian business was largely responsible for the reduction of stocks to 74,745 tons at the end of the month, lowest level since June, 1952. It was also responsible for shipments of only 8488 tons to government stockpile, the lowest figure since the government began its current program of buying last July. Production was off from March, but at 83,804 tons it was still better than in any month in 1954, except December. Unfilled orders of 65,127 tons, highest since February, 1952, indicate that business will remain strong for some time.

Stocks of special high grade still declined, and at 6559 tons it is evident there is not enough to go around. Almost as impressive is the reduction of prime western stocks to 54,230 tons, down 7384 tons from the end of March.

Primary Aluminum Sets Record

Aluminum continued its climb to new heights in March after faltering temporarily in the short month of February. According to the Aluminum Association (see chart), primary production for March was 260,543,479 lb, setting a record that is destined for short life. Every category of products in the report showed considerable gains over February. Earlier this month, Douglas Watson, McKinsey & Co., San Francisco, told the Light Metals Utilization & Fabrication Conference at Washington State College that by 1960 he expects consumption to reach 2,250,000 tons annually.

Proof of Nickel Shortage

Rumors of premium-price deals for nickel are becoming frequent. The highest heard so far is the offer of one large automaker to pay 94 cents a pound for 100 tons. Market price is 64.50. Even at this premium, the buyer got only about half the amount asked for.

Stainless steel sheathing will soon cover 42 stories containing 1,300,000 square feet of office space in New York's newest skyscraper—the Socony Vacuum Building—by Spring of 1956.

Is stainless steel coming your way, too? It's strong . . . light . . . corrosion resistant. It serves both as a structural and decorative material. And a little goes a long, long way.

Contact your supplier for full particulars.

VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y.

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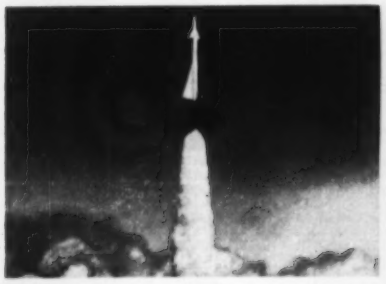
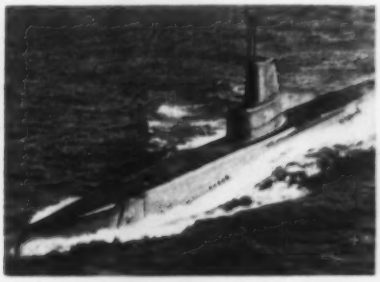
VANCORAM

Producers of alloys, metals and chemicals



UP-UP to outer space are modern rockets with engine parts of special stainless, heat-resistant steels—made with Vancoram Exlo® Low-Carbon Ferrochromium.



DOWN-DOWN to new diving depths are modern submarines with hull plates and structural members made of high-strength alloy steels to hold back tons of sea water.

STRAIGHT AHEAD and plenty fast are modern trains where diesels and passenger cars depend on alloy steels for critical operating parts, stainless for longer lasting bodies.

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 23.20, pigs 21.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 25.00; No. 43, 5% Si, 24.80; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 26.50; No. 195, 4.5% Cu, 0.8% Si, 25.90; No. 214, 3.8% Mg, 26.40; No. 356, 7% Si, 0.3% Mg, 24.90.

Antimony: R.M.M. brand, 99.5%, 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic 36.00 deld. Conn. Valley; 36.00 deld. Midwest; Lake 36.00 deld; Fire refined 35.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$120 nom. per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 99 + %, $13-$18, f.o.b. Minneapolis, depending on quantity and form. For rod, add $2 a lb; for wire, add $3 a lb.

Magnesium: 99.8%, self-palletizing pig 28.50; notched ingot 29.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.50 for both pig and ingot. Sticks 1.3 in. diameter, 49.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 34.00; alloy M 36.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50

Mercury: Open market, spot, New York, $310-$312 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3-$3.25 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 64.50; 10-lb pigs, unpacked 67.65; "XX" nickel shot 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $120-$130, nom., per troy oz.

Palladium: $17-$20 per troy oz.

Platinum: $76-$80 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$56 per troy oz.

Selenium: 99.5%, $6-$7.25 per lb.

Silver: Open market, 87.00 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Sheet, rod $68.70 per lb; powder $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 91.375.

Titanium: Sponge, 99.3+ %, grade A-1 ductile (0.3% Fe max) $3.95, grade A-2 (0.5% Fe max) $3.50 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots $4.35-$4.40 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 12.00; brass special, 12.25; intermediate, 12.50, E. St. Louis, freight allowed over 0.50 per pound. High grade, 13.35; special high grade, 13.50. Diecasting alloy ingot No. 3 16.00; Nos. 2 and 5, 16.50.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $7.50 per lb. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy, 27.50-29.00; No. 12 foundry alloy (No. 2 grade), 27.00-28.00; 5% silicon alloy, 0.60 Cu max, 29.25-29.75; 13 alloy, 0.60 Cu max, 28.75-29.50; 195 alloy, 28.50-29.75; 108 alloy, 27.50-28.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 27.75-28.50; grade 2, 27.75-28.00; grade 3, 26.25-27.75; grade 4, 25.00-26.75.

Brass Ingot: Red brass No. 115, 35.50; tin bronze No. 225, 47.50; No. 245, 40.75; high-leaded tin bronze No. 305, 39.00, No. 1 yellow, No. 405, 30.75; manganese bronze No. 421, 33.25.

Magnesium Alloy Ingot: AZ63A, 31.00; AZ91B, 26.00; AZ91B, 31.00; AZ92A, 31.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.74; rod, bar, wire, $1.71.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 41.35-42.45; 30,000-lb lots, 41.48-42.58; l.c.l., 41.98-43.08. Weatherproof, 100,000 lb, 40.78-41.60; 30,000 lb, 41.03-41.85; l.c.l., 41.53-42.35. Magnet wire deld., 15,000 lb or more, 48.15-49.31; l.c.l., 48.90-50.06.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more $20 per cwt; pipe, full coils $20 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forging billets, $9; hot-rolled and forged bars, $9.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 19.50-20.50; plates, 18.50-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1.00e per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	126
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks	...	65	...

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	63.5	62.0	...	...
0.156-0.172	53.9	52.3	...	...
0.188	53.9	52.3	...	66.8
0.219-0.234	51.1	49.5	...	...
0.250-0.281	51.1	49.5	...	63.7
0.313	51.1	49.5	...	60.8
Cold-finished				
0.375-0.547	49.9	47.5	59.8	57.2
0.563-0.688	49.9	47.5	56.9	53.7
0.750-1.000	48.7	46.3	52.1	50.6
1.063	48.7	46.3	...	48.9
1.125-1.500	46.9	44.6	50.4	48.9
Rolled				
1.563	45.7	43.4	...	...
1.625-2.000	45.1	42.8	...	47.2
2.125-2.500	44.0	41.7	...	...
2.563-3.375	42.7	40.5	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	35.9	40.4	...	...
0.135-0.096	36.4	41.3	...	...
0.095-0.077	37.1	42.3	34.6	39.6
0.076-0.061	37.7	43.2	34.8	39.8
0.060-0.048	38.2	43.6	35.1	40.2
0.047-0.038	38.7	44.5	35.6	40.6
0.037-0.030	39.1	45.0	36.0	41.3
0.029-0.024	39.7	45.5	36.3	41.8
0.023-0.019	40.4	46.9	37.1	42.6
0.018-0.017	41.2	...	37.7	43.5
0.016-0.015	42.1	...	38.5	44.7
0.014	43.1	...	39.5	46.0
0.013-0.012	44.3	...	40.2	47.0
0.011	45.3	...	41.4	48.6
0.010-0.0095	46.5	...	42.5	50.2
0.009-0.0085	47.8	...	44.0	52.3
0.008-0.0075	49.4	...	45.2	54.1
0.007	50.9	...	46.7	56.4
0.006	52.5	...	48.1	61.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.6	38.8
5050-F	35.7	39.9
3004-F	36.7	41.6
5052-F	38.4	43.4
6061-T6	39.6	44.0
2024-T4*	41.8	47.9
7075-T6*	49.6	56.2

*24-48 in. widths or diam, 72-180 in. lengths

ALUMINUM

Forging Stock: Round, Class 1, 47.80-37.30, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 53.60-41.00 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.10	2	$ 49.55
1	25.35	4	136.65
1¼	34.30	6	244.90
1½	41.00	8	368.50

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 97.00, 0.064-in. 76.00, 0.125-in. 61.50, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 59.00, 30,000 lb or more, 0.250 in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 62.00, 30,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in., 72.20; 1 x 4 in., 67.00. Rod, 1 in., 69.00; 2 in., 66.50. Tubing, 1 in. OD x 0.065 in., 90.00. Angles, 1 x 1 x ⅛-in., 75.90; 2 x 2 x ⅛-in., 70.00. Channels, 5 in., 70.90. I-beams, 5 in., 70.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 17.00-18.50; old sheet, 13.50-16.00; borings and turnings, 9.50-10.00; crankcases, 13.50-16.00; industrial castings, 13.50-16.00.

BRASS MILL PRICES

	MILL PRODUCTS a			SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.76b	52.36c	....	54.82	32.000	32.000	31.250
Yellow Brass	46.27	46.21d	46.81	49.18	28.875	26.625	22.000
Red Brass, 85%	50.99	50.93	51.53	53.80	28.125	27.875	27.375
Low Brass, 80%	49.75	49.69	50.29	52.56	27.000	26.750	26.750
Naval Brass	49.99	44.30	57.05	53.15	22.125	21.875	21.375
Com. Bronze, 90%	52.78	52.72	53.32	55.34	29.250	29.000	28.500
Nickel Silver, 10%	60.20	62.53g	62.53	....	27.625	27.375	12.813
Phos. Bronze, A, 5%	73.03	73.53	73.53	74.71	32.250	32.000	31.000
Silicon Bronze	58.82	58.01	58.86	60.80e	31.125	30.875	30.125
Manganese Bronze	53.73	47.83	58.24	....	22.125	21.875	21.375
Muntz Metal	48.14	43.95	....	....	22.375	22.125	21.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: No. 1 heavy copper and wire, 29.50-30.50; No. 2 copper, 28.00-29.00; light copper, 26.00-27.00; No. 1 composition red brass, 24.00-25.00; No. 1 composition turnings, 23.00-24.50; yellow brass turnings, 15.00; new brass clippings, 21.00-22.00; No. 1 brass rod turnings, 18.50-20.00; light brass 15.50-16.50; heavy yellow brass, 16.50-18.50; new brass rod ends, 19.00-21.00; auto radiators, unsweated, 17.50-19.00; cocks and faucets, 19.00-20.50; brass pipe, 19.00-20.50.
Lead: Heavy, 11.50-11.75; battery plate, 6.00-6.75; linotype and stereotype, 13.50-14.25; electrotype, 12.00-12.50; mixed babbitt, 12.00-14.00.
Magnesium: Clippings 18.50-19.50; clean castings 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.
Monel: Clippings 28.00-34.00; old sheet 26.00-30.00; turnings 21.00; rods 28.00-34.00.
Nickel: Sheets and clips 57.00-70.00; rolled anodes 57.00-70.00; turnings 40.00-55.00; rod ends 57.00-70.00.
Tin: No. 1 pewter 50.00-59.00; block tin pipe 75.00-77.00; No. 1 babbitt 45.00-48.00.
Zinc: Old zinc 4.50-5.00; new die cast scrap 4.75-5.00; old die cast scrap 3.25-3.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Aluminum: 1100 clippings, 18.50-20.00; 3003 clippings, 18.50-20.00; 6151 clippings, 18.50-20.00; 5052 clippings, 18.50-20.00; 2014 clippings, 18.00-19.50; 2017 clippings, 18.00-19.50; 2024 clippings, 18.00-19.50; mixed clippings, 17.50-19.00; old sheet, 16.50-17.50; old cast, 16.50-17.50; clean old cable (free of steel), 19.00-19.50; borings and turnings, 17.00-18.00.
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 48.00; light scrap 43.00.
Copper, Brass: No. 1 copper, 32.50-33.00; No. 2 copper, 31.00-31.50; light copper, 29.25-29.75; refinery brass (60% copper) per dry copper content, 29.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)
Copper, Brass: No. 1 copper, 32.00-33.00; No. 2 copper, 30.50-31.50; light copper, 28.75-29.75; No. 1 composition borings, 26.50-27.50; No. 1 composition solids, 27.00-28.00; heavy yellow brass solids, 20.00-21.00; yellow brass turnings, 19.50-20.50; radiators, 20.50-22.00.

PLATING MATERIAL

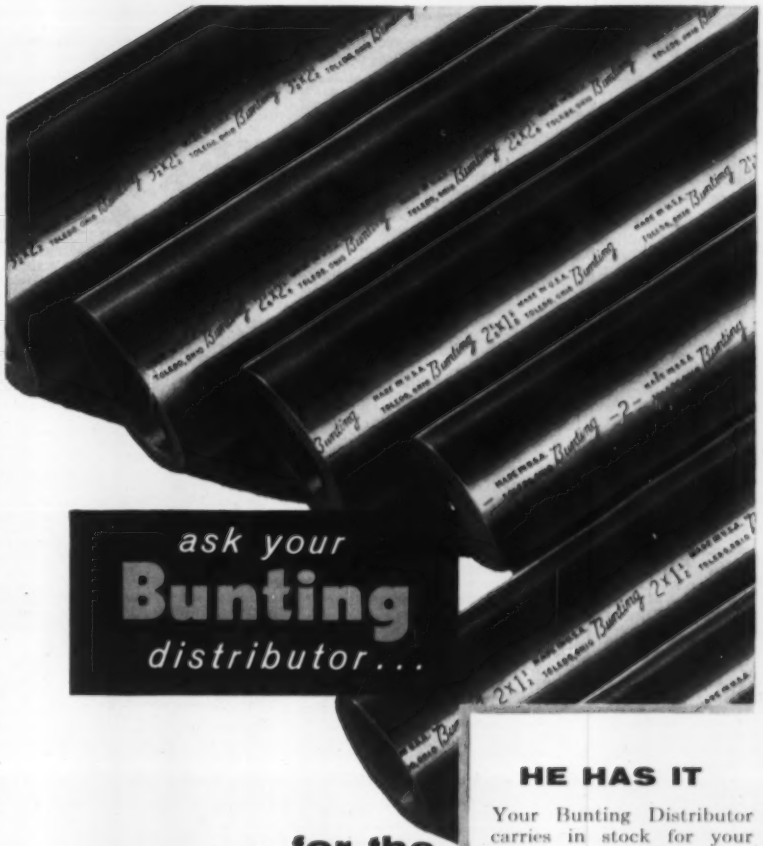
(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.
Copper: Flat-rolled 51.42, oval 50.92, 5000-10,000 lb; electrodeposited 49.40, 2000-5000 lb lots; cast 50.54, 5000-10,000 lb quantities.
Nickel: Depolarized, less than 100 lb $1.015; 100-499 lb 99.50; 500-4999 lb 95.50; 5000-29,999 lb 93.50; 30,000 lb 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.
Tin: Bar or slab, less than 200 lb, $1.095; 200-499 lb, $1.08; 500-999 lb, $1.075; 1000 lb or more, $1.07.
Zinc: Bar 20.00, bar or flat top 19.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.
Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.
Copper Cyanide: 100 lb 76.80; 200 lb 76.05; 300 lb 75.80; 400-900 lb 75.05; 1000 lb and over 73.05; effective Mar. 24, 1955.
Copper Sulphate: Crystal, 100 lb 21.50; 200 lb 18.50; 300 lb 17.50; 400 lb 17.00; 500-1900 lb 15.50; 2000-10,000 lb 15.25; 10,000 lb and up 15.15. Powder, add 0.5 to above prices. Effective Mar. 29, 1955.
Nickel Chloride: 100 lb 46.50; 200 lb 44.50; 300 lb 43.50; 400-4900 lb 41.50; 5000-9900 lb 39.50; 10,000 lb and over 38.50. All prices eastern delivery, effective Jan. 1, 1955.
Nickel Sulphate: 100 lb 38.25; 200 lb 36.25; 300 lb 35.25; 400-4900 lb 33.25; 5000-35,900 lb 31.25; 36,000 lb 30.25. All prices eastern delivery, effective Jan. 1, 1955.
Silver Cyanide: (Cents per ounce) 4-oz bottle, 83.125; 16-oz bottle, 81.875; 80-oz bottle, 79.375; 100-oz bottle, 79.375; f.o.b. St. Louis, New York and Los Angeles. Effective Apr. 6, 1955.
Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.
Sodium Stannate: Less than 100 lb, 70.10; 100-600 lb, 55.90; 700-1900 lb, 53.40; 2000-9900 lb, 51.70; 10,000 lb or more, 50.60.
Stannous Chloride (Anhydrous): Less than 50 lb, $1.558; 50 lb, $1.218; 100-300 lb, $1.068; 400-900 lb, $1.043; 1000-1900 lb, $1.019; 2000-4900 lb, 98.20; 5000-19,900 lb, 92.10; 20,000 lb or more, 86.00.
Stannous Sulphate: Less than 50 lb, $1.258; 50 lb, 95.80; 100-1900 lb, 93.80; 2000 lb or more, 91.80.
Zinc Cyanide: Under 1000 lb 54.30; 1000 lb and over 52.30.



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BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS
THE BUNTING BRASS AND BRONZE COMPANY
TOLEDO 1, OHIO
BRANCHES IN PRINCIPAL CITIES

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company. Key on page 155. Key to footnotes, page 157.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)

Detroit R7 .....$65.00
Houston S5 .....70.00
Midland,Pa. C18 .....65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 .....$64.00
Bessemer,Pa. U5 .....64.00
Bridgeport,Conn. N19 ..69.00
Buffalo R2 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 .....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 .....64.00
Lackawanna,N.Y. B2 ..64.00
LoneStar,Tex. L6 ....70.00
Munhall,Pa. U5 .....64.00
Pittsburgh J5 .....64.00
So.Chicago,Ill. R2, U5..64.00
So.Duquesne,Pa. U5 ..64.00
Youngstown R2 .....64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$78.00
Bessemer,Pa. U5 .....78.00
Bridgeport,Conn. N19 ..83.00
Buffalo R2 .....78.00
Canton,O. R2 .....80.00
Clairton,Pa. U5 .....78.00
Conshohocken,Pa. A3 ..83.00
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 .....78.00
Fontana,Calif. K1 .....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah C11 .....78.00
Houston S5 .....83.00
Johnstown,Pa. B2 .....78.00
Lackawanna,N.Y. B2 ..78.00
LosAngeles B3 .....87.50
Midland,Pa. C18 .....78.00
Munhall,Pa. U5 .....78.00
Pittsburgh J5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14. 78.00
So.Duquesne,Pa. U5 ..78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ....$86.00
Buffalo R2 .....86.00
Canton,O. R2, T7 .....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....86.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston S5 .....91.00
Ind.Harbor,Ind. Y1 ...86.00
Johnstown,Pa. B2 .....86.00
Lackawanna,N.Y. B2 ..86.00
LosAngeles B3 .....106.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago R2,U5,W14. 86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....86.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$96.50
Canton,O. R2 .....96.50
Cleveland R2 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ..96.50
So.Duquesne,Pa. U5 ...96.50

SKELP

Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 ....4.775
LoneStar,Tex. L6 .....4.30
Munhall,Pa. U5 .....3.90
SparrowsPoint,Md. B2 ..3.90
Warren,O. R2 .....3.90
Youngstown R2, U5 ....3.90

WIRE RODS

AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W12 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.475
Houston S5 .....4.925
IndianaHarbor,Ind. Y1 .4.675
Johnstown,Pa. B2 .....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. S5 ....4.925
Kokomo,Ind. C16 .....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C10 ...4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y.B11 4.675
Pittsburg,Calif. C11 ...5.325
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 .....4.675
SparrowsPoint,Md. B2..4.775
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
Torrance,Calif. C11 ....5.475
Worcester,Mass. A7 ...4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Ala.City,Ala. R2 .....4.25
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston S5 .....4.30
Ind.Harbor,Ind. I-2 ....4.25
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.25
Niles,Calif. P1 .....4.90
Portland,Oreg. O4 .....5.00
Phoenixville,Pa. 4.20
Seattle B3 .....5.00
So.Chicago U5, W14 ....4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 .....4.25

Wide Flange

Bethlehem,Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 .....5.25
Lackawanna,N.Y. B2 ..4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....4.30
So.Chicago,Ill. U5 .....4.25

Alloy Stand. Shapes

Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Houston S5 .....5.25
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 .....5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Houston S5 .....6.45
Ind.Harbor,Ind. I-2, Y1..6.40
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 .....6.45
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14.6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

BEARING PILES

Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ...5.075
Lackawanna,N.Y. B2 ..5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 .....5.075

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.225
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Bridgeport,Conn. N19 ..4.475
Buffalo R2 .....4.225
Clairton, Pa. U5 .....4.225
Claymont,Del. C22 ....4.225
Cleveland J5, R2 .....4.225
Coatesville,Pa. L7 .....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich. G5 .....4.325
Fairfield,Ala. T2 .....4.225
Fontana,Calif.(30) K1..4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C5 .....4.225
Houston S5 .....4.275
Ind.Harbor,Ind. I-2, Y1.4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2 ..4.225
LoneStar,Tex. L6 .....4.55
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ...5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago R2, U5, W14 4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ...4.225
Warren,O. R2 .....4.225
Weirton,W.Va. W6 ....4.225
Youngstown R2,U5,Y1..4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ....6.025
Geneva,Utah C11 .....5.375

PLATES, Wrought Iron

Economy,Pa. B14 .....9.80

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Coatesville,Pa. L7 .....6.45
Conshohocken,Pa. A3 ...6.45
Ecorse,Mich. G5 .....6.55
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1 ..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Houston S5 .....6.50
Ind.Harbor,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.35
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14.6.45
SparrowsPoint,Md. B2 ..6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy

Claymont,Del. C22 .....5.80
Coatesville,Pa. L7 .....5.80
Fontana,Calif. K1 .....6.45
Gary,Ind. U5 .....5.80
Houston S5 .....5.85
Ind.Harbor,Ind. Y1 ....5.80
Johnstown,Pa. B2 .....5.80
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Seattle B3 .....6.70
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14.5.80
SparrowsPoint,Md. B2 ..5.80
Youngstown Y1 .....5.80

FLOOR PLATES

Cleveland J5 .....5.275
Conshohocken,Pa. A3 ..5.275
Harrisburg,Pa. C5 .....5.275
Ind.Harbor,Ind. I-2 ...5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 .....5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10.4.975
Cleveland c.l. R2 .....4.825
Warren,O. c.l. R2 .....4.825

BARS

BAR, Hot-Rolled Carbon

Ala.City,Ala. R2 .....4.30
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.50
Atlanta A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Bridgeport,Conn. N19 ...4.55
Buffalo R2 .....4.30
Canton,O. R2 .....4.40
Clairton,Pa. U5 .....4.30
Cleveland R2 .....4.30
Ecorse,Mich. G5 .....4.40
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
FairlessHills,Pa. U5 ....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
Joliet,Ill. P22 .....4.30
KansasCity,Mo. S5 .....4.55
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.00
Massillon,O. R2 .....4.40
Midland,Pa. C18 .....4.30
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....5.00
N.Tonawanda,N.Y. B11..4.30
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23 ...5.05
So.Chicago R2,U5,W14 ..4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. R2 .....4.30
Weirton,W.Va. W6 .....4.30
Youngstown R2, U5 ....4.30

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.075
Bridgeport,Conn. N19 ..5.225
Buffalo R2 .....5.075
Canton,O. R2, T7 .....5.075
Clairton,Pa. U5 .....5.075
Detroit R7 .....5.075
Ecorse,Mich. G5 .....5.175
Fontana,Calif. K1 .....6.125
FairlessHills,Pa. U5 ...5.225
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1.5.075
Johnstown,Pa. B2 .....5.075
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....6.125
Massillon,O. R2 .....5.075
Midland,Pa. C18 .....5.075
So.Chicago R2,U5,W14..5.075
So.Duquesne,Pa. U5 ...5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5 .....5.075

BARS, H.R. Leaded Alloy

Warren,O. C17 .....5.825

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.55
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Houston S5 .....6.70
Ind.Harb.,Ind. I-2, Y1 ..6.45
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 .....6.70
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ....6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Warren,O. R2 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SanFrancisco S7 .....4.70

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston S5 .....5.45
KansasCity,Mo. S5 .....5.45
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....5.40
BeaverFalls,Pa. M12, R2..5.40
Buffalo B5 .....5.45
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 .....5.40
Detroit R7 .....5.40
Detroit B5, P17 .....5.60
Donora,Pa. A7 .....5.49
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ....5.40
Gary,Ind. R2 .....5.40
GreenBay, Wis. F7 .....5.40
Hammond,Ind. L2, M13..5.40
Hartford,Conn. R2 .....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2, S30 ....6.85
Mansfield,Mass. B5 ....5.95
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 ....5.65
Putnam,Conn. W18 .....5.95
Readville,Mass. C14 ....5.95
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...5.85
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..4.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....6.625
BeaverFalls,Pa. M12,R2 6.625
Bethlehem,Pa. B2 .....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.625
Cleveland A7, C20 .....6.625
Detroit R7 .....6.625
Detroit B5, P17 .....6.825
Donora,Pa. A7 .....6.625
Elyria,O. W8 .....6.625
Gary,Ind. R2 .....6.625
GreenBay,Wis. F7 .....6.625
Hammond,Ind. L2,M13..6.625
Hartford,Conn. R2 ....6.925
Harvey,Ill. B5 .....6.625
Lackawanna,N.Y. B2 ..6.625
LosAngeles S30 .....8.30
Mansfield,Mass. B5 ...6.925
Massillon,O. R2, R8 ..6.625
Midland,Pa. C18 .....6.625
Monaca,Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 ....6.825
So.Chicago W14 .....6.625
SpringCity,Pa. K3 .....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.625
Worcester,Mass. A7 ...6.925
Youngstown F3, Y1....6.625

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....7.525
Camden,N.J. P13 .....7.70
Carnegie,Pa. C12 .....7.525
Chicago W18 .....7.525
Cleveland C20 .....7.525
Monaca,Pa. S17 .....7.525
Newark,N.J. W18 .....7.70
SpringCity,Pa. K3 .....7.70
Warren,O. C17 .....7.525

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....4.30
Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Cleveland R2 .....4.30
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
FairlessHills,Pa. U5 ....4.45
Fontana,Calif. K1 .....5.00
Ft.Worth,Tex.(42) T4 ..4.90
Gary,Ind. U5 .....4.30
Houston S5 .....4.55

Ind.Harbor,Ind. I-2, Y1..4.30
Johnstown,Pa. B2 .....4.30
Joliet,Ill. P22 .....4.30
KansasCity,Mo. S5 ....4.55
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....5.00
Pittsburg,Calif. C11 ...5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SandSprings,Okla. S5 ...4.80
Seattle B3, N14, P23 ...5.05
So.Chicago R2 .....4.30
So. Duquesne,Pa. U5 ....4.30
So.SanFrancisco B3 ....5.05
SparrowsPoint,Md. B2 ..4.30
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Youngstown R2, U5 ....4.30

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2..5.70
KansasCity,Kans. S5 ...6.50
LosAngeles B3 .....5.95
Marion,O. P11 .....5.55
Pittsburgh J5, U5 .....5.72
Seattle B3, N14, P23 ...6.15
So.SanFrancisco B3 ....6.00
SparrowsPt. ¼-1" B2 ..5.70
Williamsport,Pa. S19 ..5.60

RAIL STEEL BARS

Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2..4.20
ChicagoHts.(4) C2, I-2..4.30
Ft.Worth,Tex.(26) T4 ..4.75
Franklin,Pa.(3) F5 ....4.20
Franklin,Pa.(4) F5 ....4.30
Marion,O.(3) P11 .....4.20
Moline,Ill(3) R2 .....4.30
Tonawanda(3) B12 ....4.15
Tonawanda(4) B12 ....4.30
Williamsport,Pa.(3) S19.4.30

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks(S.R.) L5 ....10.85
McK.Rks.(D.R.) L5 ...14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.05
Allenport,Pa. P7 .....4.05
Ashland,Ky.(8) A10 ....4.05
Cleveland J5, R2 .....4.05
Conshohocken,Pa. A3 ...4.10
Detroit(8) M1 .....4.15
Dravosburg,Pa. U5 .....4.05
Ecorse,Mich. G5 .....4.15
Fairfield,Ala. T2 .....4.05
FairlessHills,Pa. U5 ....4.10
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Geneva,Utah C11 .....4.15
GraniteCity,Ill. G4 ....4.25
Ind.Harbor,Ind. I-2, Y1.4.05
Kokomo,Ind. C16 .....4.15
Lackawanna,N.Y. B2 ...4.05
Mansfield,O. E6 (37) ...4.05
Mansfield,O. E6 (38) ...4.80
Munhall,Pa. U5 .....4.05
Newport,Ky. N9 .....4.05
Niles,O. N12 .....4.05
Pittsburg,Calif. C11 ....4.75
Pittsburgh J5 .....4.05
Portsmouth,O. P12 ....4.05
Riverdale,Ill. A1 .....4.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
SparrowsPoint,Md. B2 ..4.05
Steubenville,O. W10 ....4.05
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5, Y1 ....4.05

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.35
Kokomo,Ind. C16.....5.20
Niles,O. N12 .....4.95

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....5.80
Youngstown Y1 .....5.80

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.10
Conshohocken,Pa. A3 ...6.15
Dravosburg,Pa. U5 ....6.10
Ecorse,Mich. G5 .....6.20
Fairfield,Ala T2 .....6.10
FairlessHills,Pa. U5 ....6.15
Fontana,Calif. K1 ....6.875
Gary,Ind. U5 .....6.10
Ind.Harbor,Ind. I-2, Y1.6.10
Lackawanna(35) B2 ....6.10
Munhall,Pa. U5 .....6.10
Pittsburgh J5 .....6.10
Sharon,Pa. S3 .....6.10
So.Chicago,Ill. U5 .....6.10
SparrowsPoint(36) B2 ..6.10
Warren,O. R2 .....6.10
Weirton,W.Va. W6 ....6.10
Youngstown U5, Y1 ....6.10

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ....4.30
Cleveland R2 .....4.65
Ind.Harbor,Ind. I-2 ....4.30
Warren,O. R2 .....4.65

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....4.95
Cleveland J5, R2 .....4.95
Conshohocken,Pa. A3 ...5.00
Dravosburg,Pa. U5 ....4.95
Ecorse,Mich. G5 .....5.05
Fairfield,Ala. T2 .....4.95
FairlessHills,Pa. U5 ....5.00
Follansbee,W.Va. F4 ....4.95
Fontana,Calif. K1 .....6.05
Gary,Ind. U5 .....4.95
GraniteCity,Ill. G4 ....5.15
Ind.Harbor,Ind. I-2, Y1.4.95
Lackawanna,N.Y. B2 ....4.95
Middletown,O. A10 ....4.95
Newport,Ky. N9 .....4.95
Pittsburg,Calif. C11 ....5.90
Pittsburgh J5 .....4.95
Portsmouth,O. P12 ....4.95
SparrowsPoint,Md. B2..4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 ....4.95
Youngstown Y1 .....4.95

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.50
Dravosburg,Pa. U5 ....7.50
Ecorse,Mich. G5 .....7.60
FairlessHills,Pa. U5 ....7.55
Fontana,Calif. K1 ....8.55
Gary,Ind. U5 .....7.50
IndianaHarbor,Ind. Y1 ..7.50
Lackawanna(37) B2 ....7.50
Pittsburgh J5 .....7.50
SparrowsPoint(38) B2 ..7.50
Warren,O. R2 .....7.60
Weirton,W.Va. W6 ....7.50
Youngstown Y1 .....7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....5.55
Middletown,O. A10 ....5.45
Warren,O. R2 .....5.55

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky.	A10.6.50	....
Canton,O.	R2 ...6.50	7.10
Dravosburg	U5 ..5.70	....
Fairfield	T2 ....5.70	....
Gary,Ind.	U5 ....5.70	5.95
Ind Harbor	I-2 ..5.70	5.95
Kokomo,Ind.	C16..5.80	....
MartinsFry.	W10..5.70	....
Newport,Ky	N9..5.70	5.95
Pitts.,Calif.	C11..6.45	....
SparrowsPt.	B2 ..5.70	....

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....6.75
Gary,Ind. U5 .....5.95
MartinsFerry,O. W10 ...5.95

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.45‡
Ashland,Ky. A10 .....5.45*
Butler,Pa. A10 .....5.45†
Canton,O. R2 .....5.45‡
Delphos,O. N16 .....6.10‡
Dover,O. R1 .....5.45‡
Dravosburg,Pa. U5 ...5.45†
Fairfield,Ala. T2 .....5.45†
Gary,Ind. U5 .....5.45*
GraniteCity,Ill. G4 ....5.65‡
Ind.Harbor,Ind. I-2 ...5.45†
Kokomo,Ind. C16 .....5.55‡
MartinsFerry,O. W10 ..5.45*
Middletown,O. A10 ....5.45†
Newport,Ky. N9 .....5.45‡
Niles,O. N12 .....5.45‡
Pittsburg,Calif. C11 ...6.20*
SparrowsPt.,Md. B2 ...5.45‡
Warren,O. R2 .....5.45†
Weirton,W.Va. W6 ....5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.325

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.30
SparrowsPoint(30) B2 ..8.30

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.85
Dravosburg,Pa. U5 ....5.85
Kokomo,Ind. C16 .....6.20
Newport,Ky. N9 .....5.85
Niles,O. N12 .....5.85

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 ....5.70
Canton,O. R2 .....6.30

SHEETS, Galvanized
Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 ....5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 ....6.15

SHEETS, Aluminum Coated

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.375
Cleveland R2 .....5.375
Dravosburg,Pa. U5 ...5.375
Gary,Ind. U5 .....5.375
GraniteCity,Ill. G4 ...5.575
Ind.Harbor,Ind. I-2 ...5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 .....6.60
Yorkville,O. W10 .....7.375

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 ....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 ....5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman & Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.High Carb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R3 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellanceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel&Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...4.05
Aliesport,Pa. P7 .....4.05
Alton,Ill. L1 .....4.225
Ashland,Ky.(8) A10 ....4.05
Atlanta A11 .....4.25
Bessemer,Ala. T2 .....4.05
Birmingham C15 .....4.05
Bridgeport,Conn. N19 ..4.35
Buffalo(27) R2 .....4.05
Conshohocken,Pa. A3 ...4.10
Detroit M1 .....4.15
Ecorse,Mich. G5 .....4.15
Fairfield,Ala. T2 .....4.05
Fontana,Calif. K1 .....4.825
Gary,Ind. U5 .....4.05
Ind.Harbor,Ind. I-2, Y1.4.05
Johnstown,Pa.(25) B2 ..4.05
Lackaw'na,N.Y.(25) B2.4.05
LosAngeles(25) B3 .....4.80
Milton,Pa. M18 .....4.05
Minnequa,Colo. C10 .....5.15
N.Tonawanda,N.Y. B11..4.05
Pittsburg,Calif. C11 ....4.80
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
SanFrancisco S7 .....5.00
Seattle(25) B3, P23 ....5.05
Seattle N14 .....5.00
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
So.SanFrancisco(25) B3.4.80
SparrowsPoint,Md. B2 ..4.05
Sterling(1) N15 .....4.05
Sterling,Ill. N15 .....4.15
Torrance,Calif. C11 ....4.80
Warren,O. R2 .....4.05
Weirton,W.Va. W6 .....4.05
Youngstown U5 .....4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19 ...7.00
Carnegie,Pa. S18 .....6.70
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....6.70
Ind.Harbor,Ind. Y1 ....6.70
LosAngeles B3 .....7.90
Newport,Ky. N9 .....6.70
Seattle P23 .....7.80
Sharon,Pa. S3 .....6.70
So.Chicago W14 .....6.70
Youngstown U5, Y1 ....6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....6.15
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.15
Fontana,Calif. K1 .....7.25
Gary,Ind. U5 .....6.15
Houston S5 .....6.40
Ind.Harbor,Ind. I-2, Y1.6.15
KansasCity,Mo. S5 .....6.40
Lackawanna,N.Y. B2 ..6.15
LosAngeles(25) B3 ....6.90
Seattle(25) B3, P23 ....7.15
Sharon,Pa. S3 .....6.15
So.SanFrancisco(25) B3.6.90
SparrowsPoint,Md. B2 ..6.15
Warren,O. R2 .....6.15
Weirton,W.Va. W6 .....6.15
Youngstown U5, Y1 ....6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....4.30
Warren,O. R2 .....4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....5.75
Baltimore T6 .....5.75
Boston T6 .....6.30
Cleveland A7, J5 .....5.75
Conshohocken,Pa. A3 ..5.80
Dearborn,Mich. D3 .....5.85
Detroit D2, M1, P20 ...5.85
Dover,O. G6 .....5.75
Ecorse,Mich. G5 .....5.85
Follansbee,W.Va. F4 ...5.75
Fontana,Calif. K1 .....7.50
FranklinPark,Ill. T6 ....5.85
Ind.Harbor,Ind. I-2 ....5.85
Ind.Harbor,Ind. Y1 ....5.75
Indianapolis C8 .....5.90
LosAngeles C1 .....7.80
Middletown,O. A10 .....5.75
NewBedford,Mass. R10..6.20
NewBritain(10) S15 ....5.75
NewCastle,Pa. B4, E5 ..5.75
NewHaven,Conn. A7 ....6.50
NewHaven,Conn. D2 ....6.20
NewKensington,Pa. A6..5.75
Pawtucket,R.I. R3 .....6.40
Pawtucket,R.I. N8 .....6.30
Pittsburgh J5 .....5.75
Portsmouth,O. P12 .....5.75
Riverdale,Ill. A1 .....5.85
Rome,N.Y.(32) R6 .....5.75
Sharon,Pa. S3 .....5.75
SparrowsPt.,Md. B2 ....5.75
Trenton,N.J.(31) R5 ...7.30
Wallingford,Conn. W2 ..6.20
Warren,O. B9, R2, T5...5.75
Weirton,W.Va. W6 .....5.75
Worcester,Mass. A7 ....6.60
Youngstown C8, Y1 .....5.75

STRIP, Cold-Rolled Alloy

Boston T6 .....12.80
Carnegie,Pa. S18 .....12.46
Cleveland A7 .....12.45
Dover,O. G6 .....12.45
Fontana,Calif. K1 .....14.55
FranklinPark,Ill. T6 ..12.45
Harrison,N.J. C18 ....12.45
Pawtucket,R.I. N8 ....12.80
Sharon,Pa. S3 .....12.45
Worcester,Mass. A7 ...12.75
Youngstown C8 .....12.90

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5 .....8.60
Dearborn,Mich. D3 ....8.70
Dover,O. G6 .....8.60
Ecorse,Mich. G5 .....8.70
Ind.Harbor,Ind. Y1 .....8.60
Lackawanna,N.Y. B2 ..8.425

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Boston T6	6.30	8.35	9.30	11.45	14.15
Bristol,Conn. W1	...	...	9.30	11.45	....
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.85	8.25	9.20	....	....
Detroit D2	5.85	8.25	9.20	10.95	....
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
NewBritain,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	....
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	....
NewKensington,Pa. A6	5.75	8.05	9.00	11.15	....
NewYork W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill. A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	11.15	13.85
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6	6.60	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.90	15.60	....
Buffalo W12	...	...	12.90	....	....
FranklinPark,Ill. T6	...	...	13.40	16.10	19.50
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. A7, T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	....	....
Youngstown C8	...	...	13.25	15.95	19.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	9.10	10.10	11.00
Brackenridge,Pa. A4	....	....	9.10	10.10	11.00
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	....	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	....	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	....	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75
Zanesville,O. A10	....	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95‡	12.50‡	13.00‡	14.00‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.00	16.60	17.10	....
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2	....	....	....	....	12.70‡

*Semiprocessed. †Fully processed only. ‡Coils annealed; semiprocessed ½c lower. §Coils, ¾-cent higher.

Pittsburgh J5	8.60
Sharon,Pa. S3	8.60
SparrowsPoint,Md. B2	8.425
Warren,O. R2	8.60
Weirton,W.Va. W6	8.60
Youngstown Y1	8.60

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.35

STRIP, Electrogalvanized

Cleveland A7 .....5.75*
Dover,O. G6 .....5.75*
Riverdale,Ill. A1 .....5.85*
Youngstown C8 .....5.75*
Warren,O. B9, T5 ....5.75*
Weirton,W.Va. W6 ....5.75*
Worcester,Mass. A7....6.60*

*Plus galvanizing extras.

Strip, Galvanized (Continuous)

Sharon,Pa. S3 .....6.15
Warren,O. B9 .....6.15

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.775
Riverdale,Ill. A1 .....4.625
Sharon,Pa. S3 .....4.475
Youngstown U5 .....4.475

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Dravosburg,Pa. U5	7.50	7.75	8.15
Fairfield,Ala. T2	7.60	7.85	8.25
FairlessHills,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.575

TINPLATE,American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Dravosburg,Pa. U5	8.80	9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Pitts.Calif. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.60
Dravosburg,Pa. U5	6.60
Fairfield,Ala. T2	6.70
FairlessHills,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60

Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5 ....6.20
Follansbee,W.Va. F4 ...6.20
Gary,Ind. U5 .....6.20
GraniteCity,Ill. G4 ....6.30
Ind.Harbor,Ind. Y1 ....6.20
Yorkville,O. W10 .....6.20

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5 ....$7.85
Gary,Ind. U5 .....7.85
Yorkville,O. W10 .....7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10 .....$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5 .....9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...5.75
Aliquippa,Pa. J5 .....5.75
Alton,Ill. L1 .....5.925
Atlanta A11 .....5.95
Bartonville,Ill. K4 .....5.85
Buffalo W12 .....5.75
Chicago W13 .....5.75
Cleveland A7, C20 .....5.75
Crawfordsville,Ind. M8..5.85
Donora,Pa. A7 .....5.75
Duluth,Minn. A7 .....5.75
Fairfield,Ala. T2 .....5.75
Fostoria,O.(24) S1 ....5.95
Houston S5 .....6.00
Jacksonville,Fla. M8 ...6.27
Johnstown,Pa. B2 .....5.75
Joliet,Ill. A7 .....5.75
KansasCity,Mo. S5 ....6.00
Kokomo,Ind. C16 .....5.85
LosAngeles B3 .....6.70
Minnequa,Colo. C10 ....6.00
Monessen,Pa. P7 .....5.75
Newark 6-8 ga. I-1 ....6.40
No.Tonawanda B11 .....5.75
Palmer,Mass. W12 .....6.05
Pittsburg,Calif. C11 ....6.70
Portsmouth,O. P12 .....5.75
Rankin,Pa. A7 .....5.75
So.Chicago,Ill. R2 .....5.75
So.SanFrancisco C10 ...6.70
SparrowsPoint,Md. B2 ..5.85
Sterling,Ill.(1) N15 ....5.75
Sterling,Ill. N15 .....5.85
Struthers,O. Y1 .....5.75
Waukegan,Ill. A7 .....5.75
Worcester,Mass. A7 ....6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.20
Alton,Ill. L1 .....7.375
Bartonville,Ill. K4 .....7.30
Buffalo W12 .....7.20
Cleveland A7 .....7.20
Donora,Pa. A7 .....7.20
Duluth,Minn. A7 .....7.20
Fostoria,O. S1 .....7.20
Johnstown,Pa. B2 .....7.20
LosAngeles B3 .....8.15
Milbury,Mass.(12) N6 ..7.50
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16..7.20
Muncie,Ind. I-7 .....7.40
Palmer,Mass. W12 ....7.50
Pittsburg,Calif. C11 ...8.15
Portsmouth,O. P12 .....7.20
Roebling,N.J. R5 .....7.50
So.Chicago,Ill. R2 .....7.20
So.SanFrancisco C10 ..8.15
SparrowsPt.,Md. B2 ....7.30
Struthers,O. Y1 .....7.20
Trenton,N.J. A7 .....7.50
Waukegan,Ill. A7 .....7.20
Worcester A7,J4,T6,W12.7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....6.90
Alton,Ill. L1 .....7.075
Buffalo W12 .....6.90
Cleveland A7 .....6.90
Donora,Pa. A7 .....6.90
Duluth,Minn. A7 .....6.90
Johnstown,Pa. B2 .....6.90
KansasCity,Mo. S5 ....7.50
LosAngeles B3 .....7.85
Minnequa,Colo. C10 ...7.075
Monessen,Pa. P7, P16..6.90
NewHaven,Conn. A7 ...7.20
Palmer,Mass. W12 .....7.20
Pittsburg,Calif. C11 ....7.85
Portsmouth,O. P12 .....6.90
Roebling,N.J. R5 .....7.20
So.Chicago,Ill. R2 .....6.90
So.SanFrancisco C10 ...7.85
SparrowsPoint,Md. B2 ..7.00
Struthers,O. Y1 .....6.90
Trenton,N.J. A7 .....7.20
Waukegan,Ill. A7 .....6.90
Worcester,Mass. A7 ....7.20

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....11.375
Bartonville,Ill. K4 ....11.30
Buffalo W12 .....11.20
Chicago W13 .....11.20
Cleveland A7 .....11.20
Crawfordsville,Ind. M8.11.30
Fostoria,O. S1 .....11.20
Jacksonville,Fla. M8 ...11.73
Johnstown,Pa. B2 .....11.20
Kokomo,Ind. C16 .....11.20
Minnequa,Colo. C10 ...10.95
Monessen,Pa. P16 .....11.20
Muncie,Ind. I-7 .....11.40
Palmer,Mass. W12 .....11.50
Roebling,N.J. R5 .....11.50
So.SanFrancisco C10 ..11.55
Waukegan,Ill. A7 .....11.20
Worcester,Mass. A7, T6.11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 .....9.90
Buffalo W12 .....9.90
Johnstown,Pa. B2 .....9.90
Minnequa,Colo. C10 ..10.025
Monessen,Pa. P16 .....9.90
Muncie,Ind. I-7 .....10.10
Portsmouth,O. P12 .....9.90
Roebling,N.J. R5 .....10.20
SparrowsPt.,Md. B2 ...10.00

ROPE WIRE (A)

Alton,Ill. L1 .....9.75
Bartonville,Ill. K4 .....9.75
Buffalo W12 .....9.75
Fostoria,O. S1 .....9.75
Johnstown,Pa. B2 .....9.75
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 .....10.05
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
SparrowsPt. B2 .....9.85
Struthers,O. Y1 .....9.75
Worcester,Mass. T6 ...9.65
Worcester,Mass. J4 ....10.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Alton,Ill. L1	13.25
Bartonville,Ill. K4	13.25
Monessen,Pa. P16	13.15
Portsmouth,O. P12	13.15
Roebling,N.J. R5	13.45

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind. M8	8.05
Dover,O. G6	7.95
Fostoria,O. S1	7.95
FranklinPark,Ill. T6	8.05
Kokomo,Ind. C16	8.05
Massillon,O. R8	7.95
Milwaukee C23	8.15
Monessen,Pa. P7, P16	7.95
Pawtucket,R.I. N8	8.25
Rome,N.Y.(32) R6	7.95
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	6.90 7.30**
Aliquippa J5	6.90 7.425§
Atlanta A11	7.00 7.55
Bartonville(48) K4	7.00 7.575
Buffalo W12	6.90 7.30†
Cleveland A7	6.90
Crawfordsville M8	7.00 7.55
Donora,Pa. A7	6.90 7.30†
Duluth,Minn. A7	6.90 7.30†
Fairfield T2	6.90 7.30†
Houston,Tex. S5	7.15 7.55†
Jacks'ville,Fla. M8	7.425 7.95
JohnstownB2(48)	6.90 7.45*
Joliet,Ill. A7	6.90 7.30†
KansasCity,Mo. S5	7.15 7.55†
Kokomo C16	7.00 7.40†
LosAngeles B3	7.85
Minnequa C10	7.15 7.55**
Monessen P7 (48)	6.90 7.45
Palmer,Mass. W12	7.20 7.60†
Pitts.,Calif. C11	7.85 8.25†
Portsmouth,O. P12	6.90
Rankin A7	6.90 7.30†
So.Chicago R2	6.90 7.30**
So.S.Fran. C10	7.85 8.25**
SparrwsPt.B2(48)	7.00 7.55*
Sterling(1)(48)N15	6.90 7.475
Struthers,O.(48)Y1	6.90 7.40‡
Worcester,Mass.A7	7.20

*Based on 11c zinc; †5c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras.

WOVEN Fence, 9-15½ Ga. Col.

Ala.City,Ala. R2	146**
Ala.City, 17 ga. R2	.241**
Ala.City, 18 ga. R2	.251**
Aliq'ppa,Pa.9-14½ga.J5	149§
Atlanta A11	151
Bartonville,Ill. K4	152
Crawfordsville,Ind. M8	.151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	151†
Johnstown,Pa.(43) B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	151†
Kokomo,Ind. C16	148†
Minnequa,Colo. C10	.151**
Monessen,Pa. 9 ga. P17	.149
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	150

†Based on 5c zinc; *11c zinc; §10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. M8	.157
Donora,Pa. A7	155
Duluth,Minn. A7	156
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
Houston S5	160
KansasCity,Mo. S5	160
Kokomo,Ind. C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	156

WIRE, Barbed Col.

AlabamaCity,Ala. R2	.159**
Aliquippa J5	156§
Atlanta A11	164
Bartonville,Ill. K4	165
Crawfordsville,Ind. M8	.164
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	164†
Johnstown,Pa. B2	162*
Joliet,Ill A7	159†
KansasCity,Mo. S5	164†
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	.164**
Monessen,Pa. P7	162
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
So.SanFrancisco C10	.179**
SparrowsPoint,Md. B2	.164*
Sterling,Ill.(1) N15	163

†Based on 5c zinc; *11c zinc; §10c zinc; **Subject to zinc equalization extras.

WIRE (16 Gage)

	An'ld Galv.	Stone
Ala.City R2	13.15	14.70**
Bartonville K4	13.25	15.15
Buffalo W12	13.15	
Cleveland A7	13.15	
Crawfrdsville M8	13.25	15.10
Fostoria,O. S1	13.25	14.80†
Johnstown B2	13.15	15.00*
Kokomo C16	13.25	14.80†
Minnequa C10	13.40	15.10**
Palmer,Mass.W12	13.15	14.70†
Pitts.,Calif. C11	13.50	15.05†
So.Chicago R2	13.15	14.70
SparrowsPt. B2	13.25	15.10*
Sterling(1) N15	13.15	15.05
Waukegan A7	13.15	14.70†
Worcester A7	13.45	

*Based on 11c zinc; †5c zinc; §10c zinc; **Subject to zinc equalization extras.

NAILS, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	.137
Aliquippa,Pa. J5	.137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	.139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	145
Houston,Tex. S5	142
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	142
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142*
Monessen,Pa. P7	137
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$8.30
Wheeling,W.Va. W10	8.30

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	139
Crawfordsville,Ind. M8	139
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
SparrowsPt.,Md. B2	140
Sterling,Ill.(1) N15	138
Worcester,Mass. A7	144

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$8.77
Donora,Pa. A7	8.77
Duluth,Minn. A7	8.77
Joliet,Ill. A7	8.77
So.Chicago,Ill. R2	8.77
Coil No. 6500 Stond.	
AlabamaCity,Ala. R2	$9.05
Donora,Pa. A7	9.05
Duluth,Minn. A7	9.05
Joliet,Ill. A7	9.05
So.Chicago,Ill. R2	9.05
Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$9.10
Donora,Pa. A7	9.10
Duluth,Minn. A7	9.10
Joliet,Ill. A7	9.10
So.Chicago,Ill. R2	9.10

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants)

¾ in. and shorter:	
⅛-in. & smaller diam	2
Over ¾ in. through 6 in.:	
⅛ in. & smaller diam	+3
6 in. and shorter:	
⅞-in. and ⅝-in.	+4
¾-in. and larger	+6
Longer than 6 in.:	
All diameters	+15
Lag bolts, all diams:	
6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoe	10
Tire Bolts	+3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	55
H.P., Hex, regular & heavy:	
¾" and smaller	55
⅞" to 1¼", inclusive	58
1⅛" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy:	
All sizes	55
Hot Galv. Nuts (all types):	
¾" or smaller	38
⅞" to 1½", inclusive	41
Finished Hex Nuts:	
New standard, all sizes	55
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	55

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in. diam x 6 in. and shorter	34
1 in. and smaller diam x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	43
Plated finishes	23

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼-in. through ⅝-in.	38
¾-in. through 1 in.	15
Longer than 6 in.:	
¼-in. through ⅝-in.	20
¾-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
⅞-in. under..List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1¾	13	25.28	30.31	24.52
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2½	12	34.63	41.52	33.59
2¾	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.06	52.82	42.72

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.45	4.35	4.40	5.35
Ensley,Ala. T2	4.45	4.35	...	5.35
Fairfield,Ala. T2	...	...	...	5.35
Gary,Ind. U5	4.45	4.35	4.40	...
IndianaHarbor,Ind. I-2	4.45	4.35	4.40	...
Johnstown,Pa. B2	...	...	...(16)	5.35
Lackawanna,N.Y. B2	4.45	4.35	...	5.35
Minnequa,Colo. C10	4.45	4.35	...	5.85
Steelton,Pa. B2	4.45	4.35	...	5.35
Williamsport,Pa. S10	...	...	...	5.35

TIE PLATES

Fairfield,Ala. T2	5.275
Gary,Ind. U5	5.275
Ind.Harbor,Ind. I-2	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Seattle B3	5.425
Steelton,Pa. B2	5.275
Torrance,Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	11.50
Minnequa,Colo. C10	11.50
Pittsburgh O3, P14	11.50
Seattle B3	12.00

AXLES

Ind.Harbor,Ind. S13	6.75
Johnstown,Pa. B2	6.75

JOINT BARS

Bessemer,Pa. U5	5.425
Fairfield,Ala. T2	5.425
Ind.Harbor,Ind. I-2	5.425
Joliet,Ill. U5	5.425
Lackawanna,N.Y. B2	5.425
Minnequa,Colo. C10	5.425
Steelton,Pa. B2	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.30
Ind.Harbor,Ind. I-2, Y1	7.30
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B2	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.i.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	21.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum: Atomized, 500 lb drums, frght. allowed:	
Carlots	32.20
Ton lots	34.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	31.25-39.75†
Bronze, 5000-lb lots	51.50-54.75†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	97.00
Nickel-Silver, 5000-lb lots	47.50-51.00
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	94.00
Stainless Steel, 316	$1.25
Tin	14.50*
Zinc, 5000-lb lots	17.25-31.00‡
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼" to 1 7/16"; 1 7/16" to 1 15/16" 4.78c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.35c, H.S.-L.A.
(31) Widths over ⅝-in.; 6.40c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.10c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Ambridge, Pa. N2	13.5	...	17.5	...	20	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Youngstown Y1	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	...	...	...	...	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Alton, Ill. L1	...	...	...	...	...	...	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Benwood, W. Va. W10	24	+4.5	15.25	+10.25	7.25	+17.25	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Butler, Pa. W6	25	+3.5	17	+8.5	9.5	+15	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	...	...	...	...	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Fairless Hills, Pa. N3	...	...	...	...	...	...	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Fontana, Calif. K1	...	...	...	...	...	...	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind. Y1	...	...	...	...	...	...	22.75	5.5	25.75	9.5	28.25	13	30.75	14.25
Lorain, O. N3	...	...	...	...	...	...	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sharon, Pa. S4	25	+3.5	17	+8.5	9.5	+15	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	...	...	...	...	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B2	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	...	...	...	...	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	32.25	16.25	32.75	16.75	34.25	17	34.25	17	...	...	...	...
Alton, Ill. L1	30.25	14.25	30.75	14.75	32.25	15	32.25	15	...	...	...	...
Benwood, W. Va. W10	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Etna, Pa. N2	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Fairless Hills, Pa. N3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	31.25	15.25	31.75	15.75	33.25	16	33.25	16	24.5	6.75	25.5	6.75
Lorain, O. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	...	...	...	...
Sharon, Pa. M6	32.25	16.25	32.75	16.75	34.25	17	34.25	17	...	...	...	...
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (12.00c; East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. H.R. Strip	Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.75	21.00	30.00	34.75	30.25	35.75	37.75	41.75	38.75
302	17.75	23.25	30.25	35.00	32.50	36.00	38.00	42.00	42.00
302B	19.00	25.00	31.00	35.00	35.50	36.00	38.00	45.25	45.25
303	...	25.25	32.75	37.75	....	38.75	40.25	46.00	46.00
304	19.00	24.50	31.75	36.75	35.00	38.00	40.50	44.50	44.50
304L	....	....	36.75	41.75	40.00	43.00	45.50	49.50	49.50
305	20.50	26.50	33.50	37.25	38.00	38.00	41.00	47.50	47.50
308	20.75	27.25	36.25	41.75	39.00	43.00	47.00	49.00	49.00
309	27.75	36.00	44.00	50.50	50.50	51.75	55.00	63.25	63.25
309S	29.75	38.75	48.00	55.75	55.25	56.75	60.25	69.75	69.75
310	35.00	45.25	58.75	68.25	64.75	69.50	71.00	74.25	74.25
314	....	....	....	....	....	....	71.00	....	....
316	29.75	38.00	48.25	56.25	55.00	57.25	60.50	64.50	64.50
316L	....	....	53.25	61.25	60.00	62.25	65.50	69.50	69.50
317	35.00	45.50	59.25	68.75	69.50	70.25	72.75	79.00	79.00
321	23.50	30.25	36.00	41.50	41.75	42.75	46.50	51.25	51.25
330	....	....	61.50	....	....	72.00	73.25	81.25	81.25
18-8CbTa	29.25	38.25	46.00	52.25	53.00	53.75	58.50	66.50	66.50
403	....	....	27.00	30.75	....	32.00	34.25	....	....
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.25	26.25	28.75	30.00	34.25	34.25
414	....	....	24.50	....	....	29.25	30.50	35.25	35.25
416	....	....	24.50	28.25	....	29.25	....	....	....
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	....	25.00	28.75	....	29.75	....	....	....
431	15.00	19.25	25.00	28.75	28.00	29.75	31.00	35.75	35.75
446	....	....	33.50	38.25	50.25	39.50	40.75	59.75	59.75

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets Carbon Base 20%
Stainless:			
302	....	....	28.00
304	28.30	33.60	29.75
304-L	30.30	35.50	....
310	41.30	47.00	....
316	33.40	38.80	42.75
316-L	37.80	43.30	....
316-CB	38.90	45.50	....
321	30.00	35.30	34.25
347	32.20	38.60	44.25
405	23.90	31.10	....
410	23.40	30.60	....
430	23.40	30.60	24.25
Inconel	47.90	63.90	....
Nickel	39.50	54.10	....
Monel	40.80	54.80	....
L-Nickel	41.70	58.50	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	26.60	33.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.030
18.25	4.25	1	4.75	....	2.245-2.415
18	4	2	9	....	2.615
18	4	2	....	....	1.705
18	4	1	....	....	1.540
14	4	2	5	....	2.185
13.75	3.75	2	5	....	2.185
13.5	4	3	....	....	1.805
9	3.5	....	....	....	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.900

Tool steel producers include; A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Alabama City, Ala. R2	52.38	52.88	....	
Birmingham R2	52.38	52.88	....	
Birmingham U6		52.88	56.50†	
Gadsden, Ala. R2	52.38	52.88	....	
Cincinnati, deld.		60.58	....	
Buffalo District				
Buffalo H1, R2	56.00	56.50	57.00	57.50
Tonawanda, N.Y. W12	56.00	56.50	57.00	
No. Tonawanda, N.Y. T9		56.50	57.00	57.50
Boston, deld.	66.65	67.15	67.65	
Rochester, N.Y., deld.	59.02	59.52	60.02	
Syracuse, N.Y., deld.	60.12	60.62	61.12	
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary, Ind. U5	56.00	....	56.50	
Indiana Harbor, Ind. I-2	56.00		56.50	
So. Chicago, Ill. W14, Y1	56.00	56.50	56.50	
So. Chicago, Ill. U5	56.00		56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
Muskegon, Mich., deld.		62.80	62.80	
Cleveland District				
Cleveland A7, R2	56.00	56.50	56.50	57.00
Akron, O., deld.	58.75	59.25	59.25	59.75
Lorain, O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem, Pa. B2	58.00	58.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro, Pa. B10	58.00	58.50	....	....
Chester, Pa. C31	....	48.50	49.00	....
Philadelphia, deld.	....	50.16	50.66	....
Steelton, Pa. B2	58.00	58.50	59.00	59.50
Swedeland, Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	60.16	60.66	61.16
Troy, N.Y. R2	58.00	58.50	59.00	59.50
Pittsburgh District				
Neville Island, Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	57.87	57.87	58.37
McKees Rocks, deld.	....	57.54	57.54	58.04
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	58.16	58.16	58.66
Verona, Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer, Pa. U5	56.00	....	56.50	57.00
Clairton, Rankin, So. Duquesne, Pa. U5	56.00	....	....	....
McKeesport, Pa. N3	56.00	....	....	57.00
Midland, Pa. C18	56.00	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard, O. Y1		....	56.50	....
Sharpsville, Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1		....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield, O., deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie, Pa. I-3	56.00	56.50	56.50	57.00
Everett, Mass. E1	60.50	61.00	61.50	....
Fontana, Calif. K1	62.00	62.50	....	....
Geneva, Utah C11	56.00	56.50	....	....
Granite City, Ill. G4	57.90	58.40	58.90	....
Ironton, Utah C11	56.00	56.50	....	....
Lone Star, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	58.00	59.00	59.00	....
Rockwood, Tenn. T2		52.50*	56.50	....
Toledo, O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos, southern grade. †Phos, 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson, O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50 Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$80.50
Keokuk, Iowa, (Open-hearth & Fdry, freight allowed K2)	85.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	88.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland A7 (Intermediate)	$61.00
Lyles, Tenn. T3	70.00
Rockwood, Tenn. T3	70.00
Steelton, Pa. B2	64.00
Philadelphia, deld.	67.55
Troy, N.Y. R2	64.00

Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Buffalo, 25 cents; Birmingham and St. Paul, 15 cents; Philadelphia, New York, Boston and Los Angeles, 10 cents; Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Galv. 10 Ga.†	Stainless Type 302‡§	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††‖		Carbon	Floor
Baltimore	6.02	7.51	7.79	....	6.69	....	6.68	8.02[6]	12.54	6.72	6.37	7.76
Birmingham	6.35	7.35	8.25[3]	....	6.60	....	6.50	9.10		6.65	6.65	8.45
Boston	7.23	8.23	9.57	45.28[9]	7.47	....	7.20	8.60	12.30	7.49	7.37	8.50
Buffalo	6.35	7.40	8.84	....	6.70	....	6.50	7.40	12.00	6.72	6.65	7.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	....	7.10	8.37		7.10	7.10	8.37
Chicago	6.38	7.38	8.30	46.05	6.62	....	6.51	7.25	11.75	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.30	46.10	6.86	....	6.75	7.55	12.00	6.86	6.81	7.89
Cleveland	6.38	7.38	8.25	46.16	6.72	....	6.57	7.35	11.81	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.54	11.95	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	....	6.50	7.45[4]	....	6.69	6.52	7.64
Houston	7.35	7.80	9.99	....	7.70	9.30	7.70	9.30		7.60	7.35	8.75
Los Angeles	7.50	9.35	9.95	50.15	7.85	11.75	7.45	10.15	13.15	7.65	7.45	9.55
Milwaukee	6.47	7.47	8.39	....	6.71	....	6.60	7.44	11.84	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	....	6.86	7.60		7.04	6.87	....
New York	6.97	7.91	8.79	44.95	7.56	....	7.37	8.73[6]	12.13	7.38	7.27	8.68
Norfolk, Va.	7.00	....	....	....	7.10	....	7.10	8.60		7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.98[9]	6.96	8.80	6.74	7.86[5]	11.96	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	46.00	6.72	....	6.51	7.35	11.75	6.69	6.52	7.64
Portland, Oreg.	7.00	7.75	9.10	48.50	7.25	....	7.05	10.20	14.00	7.00	6.85	8.75
Richmond, Va.	6.43	7.39	8.67	....	6.77	....	6.71	8.33		7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	....	6.80	7.64[5]	12.04	7.09	6.81	7.93
St. Paul	7.04	8.04	8.96	....	7.28	....	7.17	8.01	....	7.35	7.18	8.30
San Francisco	7.55	8.95	9.45	51.65	7.80	....	7.35	10.05	13.05	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	51.00	8.20	....	7.80	10.95	13.50	7.75	7.80	9.60
Spokane	8.35	9.65[1]	10.15	....	7.80	....	7.80	10.85§§	14.25	7.45	7.56	9.60
Washington	6.70	7.99	7.97	....	7.37	....	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, based on 11.50-cent zinc except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅛-in. and heavier; ††as annealed; ‖prices include $2 for crating; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars 2000 lb and over except in Seattle, 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [1]—500 to 9999 lb; [3]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

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PATENT APPLIED FOR

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With remarkable new Aeroquip *SOCKETLESS* fittings and hose, fuel, oil, water, and air lines can be made and installed *extra fast* on all kinds of industrial and mobile equipment. Field replacement is simplified because Kit 5144 is compact (12½" x 12½" x 6½" when closed) and it will stand up in field service.

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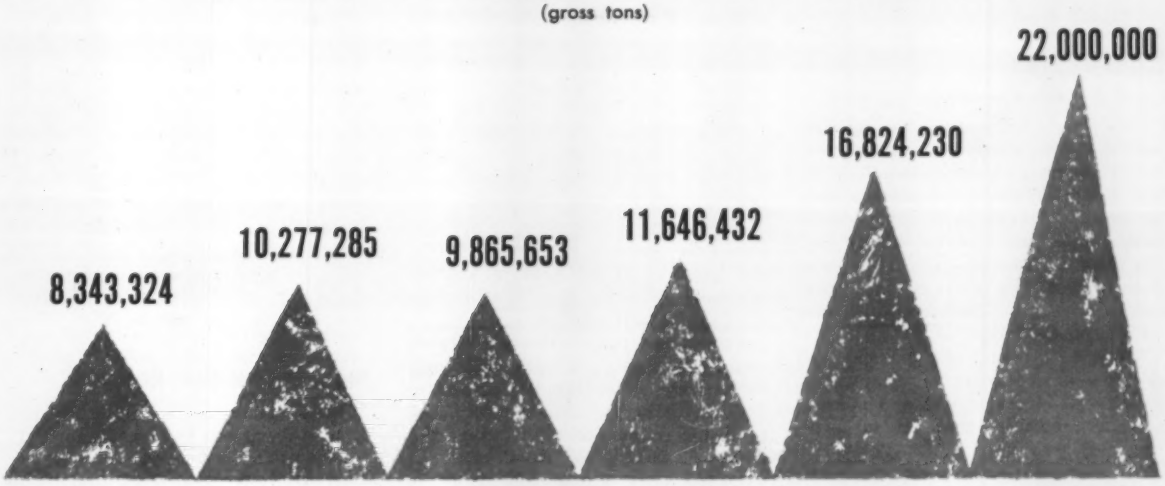
Total Iron Ore Imports and Taconite Shipments

(gross tons)



	1950	1951	1952	1953	1954	1955*
Brazil	701,329	1,037,828	1,010,919	458,282	595,907	750,000
Canada	1,852,508	1,961,990	1,822,038	1,841,633	3,536,118	5,000,000
Chile	2,606,557	2,767,207	1,861,575	2,363,401	1,664,300	1,660,000
Liberia	None	110,123	572,485	720,440	764,815	920,000
Peru	None	None	None	844,481	1,921,576	1,920,000
Taconite	62,087	137,607	105,028	561,347	1,042,598†	1,450,000†

*Estimated by STEEL. †Includes jasper.

Sources: Lake Superior Iron Ore Association; U. S. Bureau of Mines.

Steelmakers Buy More Insurance for Furnaces

DOMESTIC STEEL PRODUCERS are buying more imported ore and taconite this year than ever before.

As the higher-grade ores of the Lake Superior region show signs of petering out and as U. S. steelmaking capacity expands, it becomes obvious that some outside sources of blast-furnace ore must be developed. The table above shows what progress has been made.

Some Will Gain—Three sources loom as the most important in the foreseeable future: Venezuela, Canada and taconite from the Lake Superior region. High-grade Venezuelan ores should develop more rapidly over the next five years than the other sources because of the direct water shipping lanes from mines to producers. At the end of that time, the St. Lawrence Seaway will be in operation, and shipments of Labrador ores to the steelmaking centers of the Midwest will show a sharp rise.

Taconite will develop spectacularly if present plans materialize. Shipments this year will be only about 1.5 million gross tons, but by 1957, they should be close to 10 million tons and about 30 million tons by 1970. That's nearly half as much as the whole Lake Superior region shipped in 1954. It has been estimated that there are at least 5 billion gross tons of taconite ore in that area, which would yield about 1.5 billion tons of concentrate.

Others Will Drop Out—Of the other major sources listed above, Liberia is the most important, even though tonnage now is not so great as that from Peru and Chile. This rich African ore still is in the early stages of development, and imports have been climbing steadily. Peruvian and Chilean ores are declining in importance to domestic steelmakers as Venezuelan shipments increase. It is anticipated that by 1957 the U. S. will be importing little, if any, of the former.

In addition to the sources listed above, about a dozen others will supply a total of nearly 2.5 million tons of ore this year. Most of it, a high-grade ore that goes into specialty steels, will come from Sweden. A new source is Bethlehem Steel Co.'s beneficiation plant at Marmora in eastern Ontario. First shipment from there went out last week to Bethlehem's Lackawanna, N. Y., works. Production is expected to reach 250,000 tons this year, with a rated capacity of about 500,000 gross tons.

Mesabi Still Kicking—The bulk of the ore for U. S. blast furnaces will continue to come from the Mesabi range and the other great deposits of the Lake Superior region. Best guesses place reserves of commercial quality at about 1.5 billion tons, and exploration is going on continuously to raise that figure. But steelmakers aren't taking any chances and will continue to invest in other sources.

Iron Ore . . .

Iron Ore Prices, Page 167

Iron ore is moving down the Great Lakes in near-record volume. In the week ended May 9, the fleet hauled 2,336,455 gross tons, reports the Lake Superior Iron Ore Association. This brought the season's total to 6,452,826 tons, nearly double that in the

like period of 1954 and only a little more than 2 million tons under the record-shipment pace set in 1953. Total movement in that season topped 96 million gross tons.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 155 & 156

The way things are shaping up, tight sheet supply will be experienced pretty much through remainder of this year. While tonnage still can be had for August shipment, mill order books are rapidly filling for the third quarter—in fact, some producers could be sold out for the period were they disposed to accept all the business offered.

Meanwhile, consuming demand for all types of sheets continues upward. Despite the tight supply and strong demand, however, there is no evidence of gray market activity.

Midwest sheetmakers say the auto builders would increase their intake of cold-rolled sheets during June, July and August were it possible. Automotive ordering for the third quarter appears to be following the pattern set in the second three months of the year. All district sheet mill order books are filling for the third quarter, one Chicago area producer reporting business offered it exceeds by 25 to 50 per cent its ability to accommodate.

Hot and cold-rolled carbon sheets can still be had in the East for delivery in August where buyers have regular sources of supply and their requirements conform with the pattern of past purchases.

Even so, the mills will enter third quarter with substantial shipment arrearages. It is doubtful if any galvanized sheets, especially the continuous hot-dipped grade, can be had before September, except for occasional spot openings which may result from order cancellations.

A large Pittsburgh district strip mill which usually closes for vacation, this year plans to continue operations as close to capacity as possible.

During March, sheet and strip shipments totaled 2,781,757 net tons, 38.3 per cent of the over-all steel mill tonnage. This compares with 31 per cent in March a year ago. The first quarter total was 7,757,676 tons, or 40 per cent of over-all shipments. In the first quarter last year it was 32.9 per cent.

Sheets and strip were the largest tonnage groups in March, reflecting, to considerable extent, the high level of activity in the auto industry, the largest consumer of steel during the month. The auto steel take at 1,679,200 tons set a new monthly high for the industry, the previous peak being in January, when it took 1,559,774 tons.

Pig Iron . . .

Pig Iron Prices, Page 159

While far from brisk, pig iron demand is creeping upward. One leading producer reports shipments have gained the last two months and is confident they will increase more this month. Volume in June will decline as a prelude to plant shutdowns for vacations.

Buying of merchant foundry iron is exceeding consumption, with buyers apparently covering more actively in anticipation of higher prices this summer. At the time of the general increase in steel prices last summer, following steel wage increases, there was no advance in pig iron prices. This year there is growing belief among consumers that pig iron prices will be hiked.

In the Midwest, foundries are stepping up their melting activities moderately to keep pace with a gain in orders for castings. Contrary to earlier expectations, automotive foundries are maintaining their schedules at a high level. Gray iron foundry operations in the New York metropolitan area are estimated at between 70 and 75 per cent of normal.

Republic Steel Corp. has all its southern blast furnaces in operation. Its No. 2 blast furnace at Gadsden, Ala., was lighted last week.

Steel Output Sets Record

Steel production of 9,806,000 net tons in April was the highest for that month in any year, reports the American Iron & Steel Institute. The previous record was set in 1953 when production totaled 9 545,538 tons. Output a year ago was 6,970,937 tons.

Last month's production was 94.7 per cent, compared with 93.4 per cent in March. The total tonnage for March, a longer month, was higher at 9,981,754 net tons. Output for the first four months this year was at a rate of 89.7 per cent of capacity.

Record shipments of steel to the automotive industry in March helped raise total finished steel shipments for that month to the second highest figure ever attained. The March total was 7,268,795 net tons, exceeded only by the 7,436,919 tons shipped in March, 1953.

Comparative production data are given in the accompanying table.

	OPEN HEARTH			BESSEMER			ELECTRIC			TOTAL			Calculated weekly production	Number of weeks
Period	Net tons	Per cent of capacity	‡Index	Net tons	Per cent of capacity	‡Index	Net tons	Per cent of capacity	‡Index	Net tons	Per cent of capacity	‡Index	(Net tons)	in month
1955														
January	8,054,345	86.0	125.7	199,229	49.0	56.7	584,162	63.6	163.6	8,837,736	82.7	124.2	1,994,974	4.43
February	7,734,884	91.5	133.7	197,091	53.7	62.1	564,959	68.1	175.1	8,496,934	88.0	132.2	2,124,233	4.00
*March	9,060,028	96.7	141.4	256,493	62.8	72.7	666,235	72.6	186.5	9,981,754	93.4	140.3	2,253,281	4.43
*1st Quarter	24,849,255	91.4	133.6	651,813	55.2	63.9	1,815,356	68.1	175.1	27,316,424	88.0	132.3	2,124,139	12.86
†April	8,856,000	97.6	142.9	275,000	69.8	80.9	675,000	75.9	195.3	9,806,000	94.7	142.4	2,286,000	4.29
1954														
January	7,256,526	78.3	113.3	260,453	64.0	74.1	434,507	48.9	121.7	7,951,486	75.3	111.8	1,794,918	4.43
February	6,523,213	77.9	112.8	174,253	47.4	54.9	385,771	48.1	119.6	7,083,237	74.3	110.2	1,770,809	4.00
March	6,649,667	71.7	103.8	207,726	51.1	59.1	432,207	48.7	121.0	7,289,600	69.0	102.5	1,645,508	4.43
1st Quarter	20,429,406	75.9	109.9	642,432	54.4	63.0	1,252,485	48.6	120.8	22,324,323	72.8	108.1	1,735,950	12.86
April	6,365,326	70.9	102.7	162,657	41.3	47.8	442,954	51.5	128.2	6,970,937	68.1	101.3	1,624,927	4.29
May	6,817,951	73.6	106.4	198,063	48.7	56.4	456,724	51.4	127.9	7,472,738	70.7	105.0	1,686,848	4.43
June	6,702,006	74.7	108.1	207,666	52.7	61.1	453,962	52.8	131.3	7,363,634	72.0	107.0	1,716,465	4.29
2nd Quarter	19,885,283	73.1	105.8	568,386	47.6	55.1	1,353,640	51.9	129.1	21,807,309	70.3	104.4	1,676,196	13.01
1st Half	40,314,689	74.5	107.8	1,210,818	51.0	59.0	2,606,125	50.3	125.0	44,131,632	71.5	106.2	1,705,900	25.87
July	6,040,120	65.3	94.3	205,313	50.6	58.4	382,164	43.1	107.0	6,627,597	62.9	93.2	1,499,456	4.43
August	6,021,496	65.0	94.0	217,837	53.6	62.0	427,574	48.2	119.7	6,666,907	63.1	93.7	1,504,945	4.43
September	6,140,266	68.6	99.1	214,065	54.5	63.0	453,152	52.8	131.1	6,807,483	66.7	98.9	1,590,533	4.28
3rd Quarter	18,201,882	66.3	95.8	637,215	52.9	61.1	1,262,890	48.0	119.1	20,101,987	64.2	95.2	1,530,997	13.13
9th Month	58,516,571	71.7	103.7	1,848,033	51.6	59.7	3,869,015	49.5	123.0	64,233,619	69.1	102.5	1,647,016	39.00
October	6,973,568	75.2	108.9	237,754	58.5	67.7	490,211	55.2	137.3	7,701,533	72.9	108.3	1,738,495	4.43
November	7,307,151	81.4	117.9	231,191	58.7	68.0	551,085	64.1	159.4	8,089,427	79.1	117.5	1,885,647	4.29
December	7,530,204	81.4	117.6	231,126	57.0	65.8	525,743	59.4	147.2	8,287,073	78.6	116.5	1,874,903	4.42
4th Quarter	21,810,923	79.3	114.7	700,071	58.0	67.1	1,567,039	59.5	147.8	24,078,033	76.8	114.0	1,832,423	13.14
2nd Half	40,012,805	72.8	105.2	1,337,286	55.4	64.1	2,829,929	53.8	133.5	44,180,020	70.5	104.6	1,681,787	26.27
Total	80,327,494	73.6	106.5	2,548,104	53.2	61.6	5,436,054	52.0	129.3	88,311,652	71.0	105.4	1,693,741	52.14

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1954 of 2,092,342 net tons open hearth, 91,810 net tons bessemer and 200,397 net tons electric ingots and steel for castings, total 2,384,549 net tons; based on annual capacities as of Jan. 1, 1954, as follows: Open hearth 109,094,730 net tons, bessemer 4,787,000 net tons, electric 10,448,680 net tons, total 124,330,410 net tons.

*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

Tin Plate . . .

Tin Plate Prices, Page 156

Youngstown Sheet & Tube Co. will install new tin mill facilities at its Indiana Harbor (Ind.) Works which will virtually double its electrolytic tinning capacity.

The rush is on to provide canmakers enough tin plate in advance of the canning season. Tin mills expect to operate at capacity through remainder of this quarter. Demand will continue strong into the third quarter.

U. S. Steel Corp., Pittsburgh, has issued a revised extra card on black plate, effective May 10. Except for the addition to the quality differentials of a chemically treated extra of $0.70, the card is unchanged from the one it supersedes. It was dated Oct. 1, 1954.

Steel Bars . . .

Bar Prices, Page 154

Barmakers are looking to the third quarter with growing confidence that demand will continue strong through the period. They are booking orders for August and September shipment, although some slow-moving sizes can still be obtained for June shipment. Bulk of current ordering, however, is for the third quarter.

Two months ago many bar producers were concerned about July and August prospects. Now, their doubts have faded, though some slackening in sales next quarter is anticipated. In general, the outlook for strong demand into the fourth quarter is said to be promising.

Buyers of hot-rolled carbon bars in the East are buying more actively. This is being reflected in mounting mill order backlogs. Some producers have little tonnage to offer before August. Cold drawers are specifying freely. Like other consumers, they are not getting as much tonnage as they want—at least not so quickly as they desire it. Fasteners manufacturers are ordering briskly.

Relatively little tonnage is open in July mill schedules in the Philadelphia area. Some makers say they shortly will be out of the market for August shipment. Cold-drawn deliveries reflect the scarcity of hot stock more than lack of drawing facilities. However, shipment promises vary considerably. Some sellers are still able to book orders for late June, while others haven't much tonnage left for delivery before August.

In the Chicago district, users are increasing their consumption and are seeking to get on mill books for larger quantities. Rolling cycles on all grades have been stretched to make quick deliveries of many sizes and types out of the question. Automotive needs top the list, but farm machinery and general industry continue prominent in demand.

Bar and tool steel shipments in March (latest month for which data are available) totaled 1,099,611 tons, or 15.1 per cent of total steel movement from the mills. Of this total, 868,006 tons were carbon; 223,291 tons, alloy; and 8314 tons, stainless. Shipments in the first quarter totaled 2,882,737 tons, 14.9 per cent of the over-all movement.

Wire . . .

Wire Prices, Pages 156 & 157

Order backlogs are heaviest in New England on highway and building tonnage, wire for welded mesh, guard strand and miscellaneous larger sizes. Producers are booked into the fourth quarter on some of these items.

Manufacturers wire schedules are filled for June, with some third quarter volume being booked, although consumers are reluctant to take into consideration the need for longer lead time. This also holds true for

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NEW ISSUE

$191,659,000

Bethlehem Steel Corporation

3¼% Twenty-five-Year Debentures

Due May 1, 1980

Convertible into Common Stock through May 1, 1965, unless called for previous redemption

These Debentures are being offered by the Corporation to holders of its Common Stock for subscription, subject to the terms and conditions set forth in the Prospectus. The subscription offer will expire at 3:30 P.M., Eastern Daylight Saving Time, on May 23, 1955. The several underwriters may offer Debentures pursuant to the terms and conditions set forth in the Prospectus.

SUBSCRIPTION PRICE 100%

Copies of the Prospectus may be obtained in any State only from such of the several underwriters named in the Prospectus and others as may lawfully offer these securities in such State.

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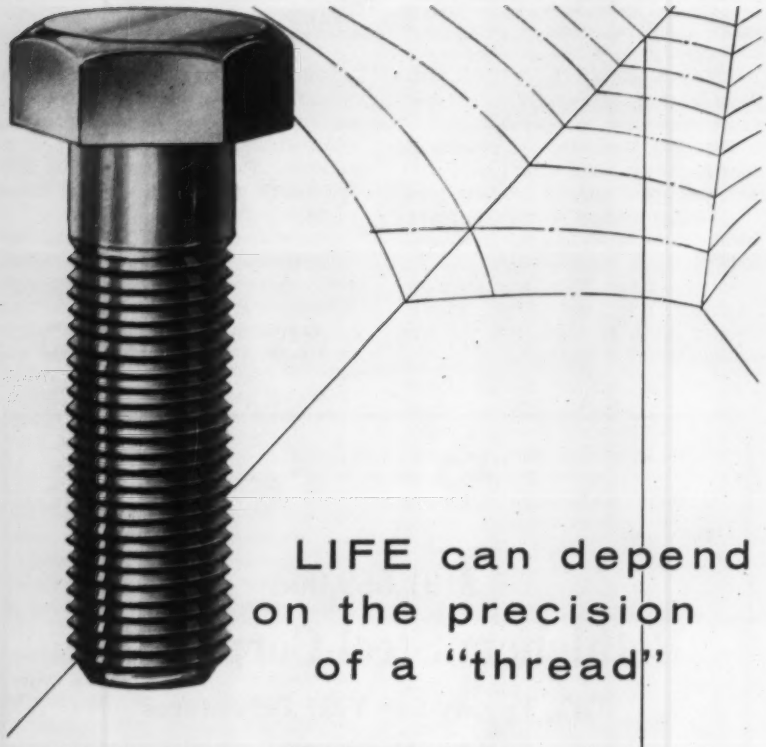
May 3, 1955



LIFE can depend on the precision of a "thread"

Whether you are traveling through space at super-sonic speeds . . . enjoying a Sunday drive with the family . . . or harvesting the crops . . . life can depend on the precision of a thread.

Chandler, as a leading manufacturer of fasteners, specializes in precision products only. Chandler fasteners are manufactured to the highest standards of uniformity.

The spider isn't the only creature whose life depends on a thread. Because of the tremendous demands made on today's machines, Chandler pays particular attention to the threads of every fastener. In fact, Chandler specializes in thread rolling after heat treating.

CHANDLER PRODUCTS CORPORATION

1488 Chardon Road • Cleveland 17, Ohio

6173-CH

heading wire and furniture spring grades.

In the Midwest, wire deliveries extend through June and substantial business is being booked for third quarter shipment.

Wire product shipments in March totaled 398,476 net tons, or 5.5 per cent of total shipments. In the first quarter of this year wire accounted for 1,034,061 tons, or 5.3 per cent of total shipments. This compares with 4.7 per cent in the like period of last year.

Plates . . .

Plate Prices, Page 154

Instead of leveling off, plate demand appears to be more active than ever. Structural and oil tank requirements are running high. The warehouses are specifying more freely. Demand is even being boosted by shipyard and railroad needs, which are still far from heavy. Export movement continues to be fair.

Eastern producers generally are booked through July and at the rate of present demand will soon be out of the market for August. If they wanted to take all the tonnage offered them, they could close out schedules for the third quarter.

This is particularly true in the Philadelphia area where plate business got off to a relatively slow start this year and is now making up for lost time with a vengeance. Currently, plates are perhaps the most active item in the steel product list, despite only moderate improvement in shipwork and railroad equipment requirements.

Not only are the district producers being pressed for tonnage, but the leading distributors of diversified products say they are receiving more inquiry for plates than for any other major product.

Most producers say their arrearages will be substantial as they go into the next quarter, so heavy has been the flow of business over recent weeks. Increasing stringency is ascribed not only to heavier consumption but also to lack of strip plate. The continuous sheet and strip mills are centering production on the more profitable lighter items. Buying also reflects stockpiling to some extent as a hedge against a shortage.

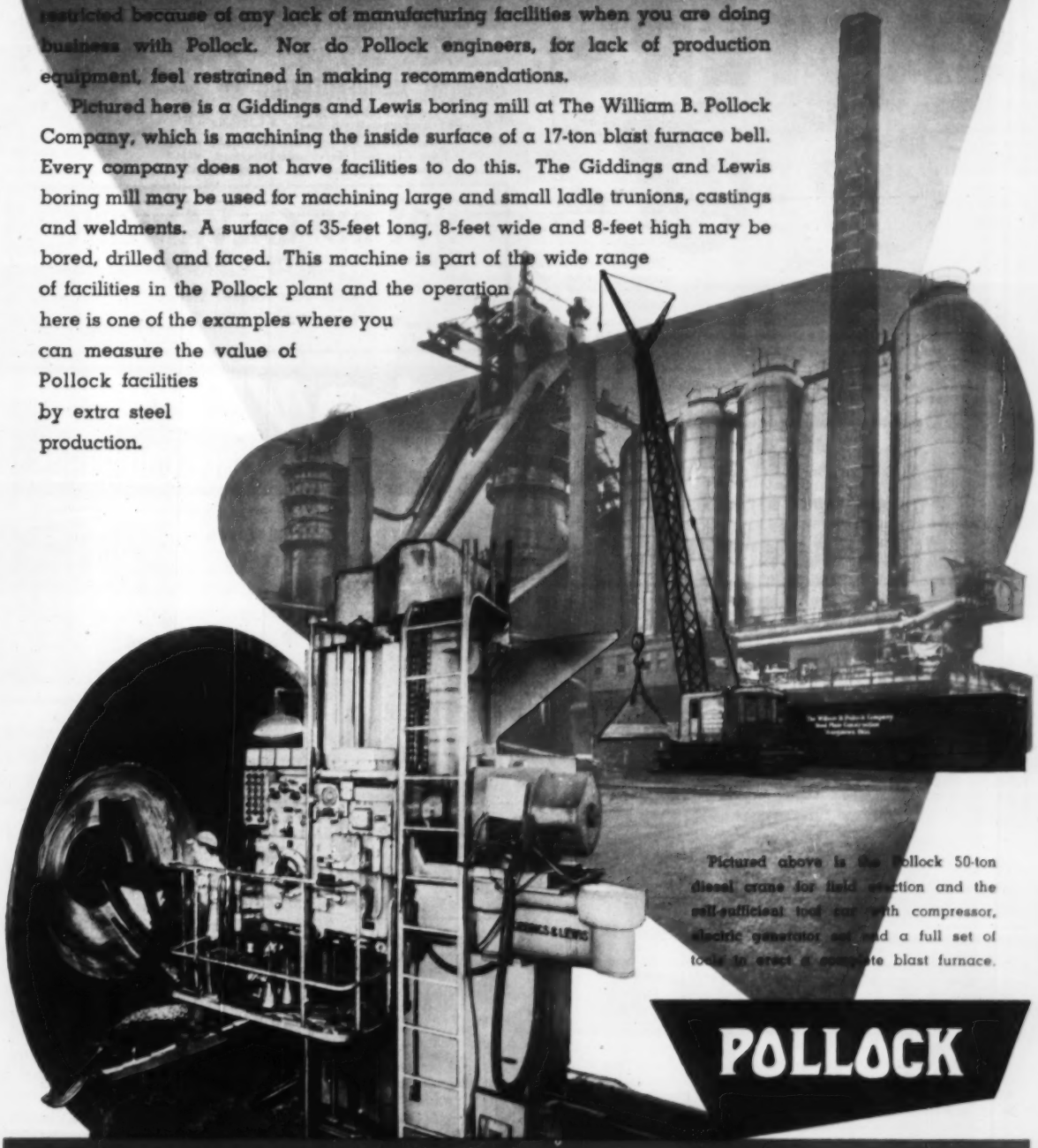
Plate demand is as strong in the Chicago market as is that for sheets, with the second quarter a sellout and order books filling rapidly for the third quarter. Consumers' needs appear solid and include all forms of heavy construction such as tanks, freight cars, pipelines and buildings.

(*Please turn to page* 167)

POLLOCK facilities encourage higher specification standards in steel construction

Your progressive ideas for blast furnaces and steel plants are not restricted because of any lack of manufacturing facilities when you are doing business with Pollock. Nor do Pollock engineers, for lack of production equipment, feel restrained in making recommendations.

Pictured here is a Giddings and Lewis boring mill at The William B. Pollock Company, which is machining the inside surface of a 17-ton blast furnace bell. Every company does not have facilities to do this. The Giddings and Lewis boring mill may be used for machining large and small ladle trunions, castings and weldments. A surface of 35-feet long, 8-feet wide and 8-feet high may be bored, drilled and faced. This machine is part of the wide range of facilities in the Pollock plant and the operation here is one of the examples where you can measure the value of Pollock facilities by extra steel production.



Pictured above is the Pollock 50-ton diesel crane for field erection and the self-sufficient tool car with compressor, electric generator and a full set of tools to erect a complete blast furnace.

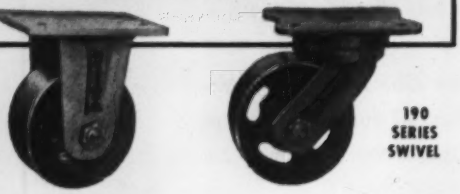
POLLOCK

THE WILLIAM B. POLLOCK COMPANY • YOUNGSTOWN, OHIO

STEEL PLATE CONSTRUCTION · ENGINEERS · FABRICATORS · ERECTORS

BLAST FURNACES • HOT METAL CARS AND LADLES • CINDER AND SLAG CARS • INGOT MOULD CARS • CHARGING BOX CARS • WELDED OPEN HEARTH LADLES

HEAVY "FORGED" CASTERS



290 SERIES RIGID

190 SERIES SWIVEL

Built for extra-heavy duty, these forged steel casters can be used on your hardest, toughest jobs—to carry heavy loads under the most severe operating conditions. Hyatt roller wheel bearings have hardened inner race around axle bolt and between fork sides for accurate wheel fit without binding. Whatever your caster requirements, see THOMAS *first*.

There is a THOMAS Representative in every Trade Area. Write for free literature describing the complete line of THOMAS "Job-Suited" Trailers, Trucks, Casters and Wheels.

THOMAS

THOMAS TRUCK & CASTER CO.

538 MISSISSIPPI RIVER, KEOKUK, IOWA

"AUTO-STEER" SAFETY TRUCK

No. 298

- *FOR HEAVY LOADS*
- *MAKES SHARP TURNS*
- *NO DANGER OF TIPPING*

Wheels are located under the frame so that each corner is supported at all times. Auto-Steer front wheel assembly permits right angle turns and easy maneuvering of high, heavy loads even in a limited space. Large safety handle operates auto-steer device so that both wheels turn in unison. Ring grip permits tractor or hand operation. Available in 3-ton and 5-ton capacities, in sizes "Job-Suited" to your requirements.

There is a THOMAS Representative in every Trade Area. Write for free literature describing the complete line of THOMAS "Job-Suited" Trailers, Trucks, Casters and Wheels.

THOMAS

THOMAS TRUCK & CASTER CO.

538 MISSISSIPPI RIVER, KEOKUK, IOWA

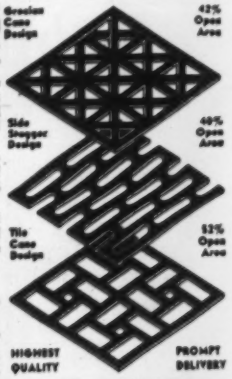
PERFORATED METALS

FOR EVERY INDUSTRIAL USE

The "Ornamental" light-gauge designs here illustrated are only a few of the many you can choose from in our new Catalog 39 and we are always pleased to quote on original designs or special work of any kind.

For larger unit-openings, using metals up to ¼" in thickness, we offer a wide variety of equally attractive designs in our Catalog 36 on Diamond Architectural Grilles.

Send us your blueprints. We are equipped to fabricate special sections to any desired extent and welcome opportunities to make money-saving suggestions.



DIAMOND MANUFACTURING CO.

Box 32 WYOMING (Wilkes-Barre Area) PENNA.

Sales Representatives in all principal cities. Consult Your Classified Telephone Directory.

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JOSEPH P. CATTIE & BROTHERS, INC.

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✓VARIABLE SPEED PULLEYS and TRANSMISSIONS

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✓MOTOR BASES

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LOVEJOY FLEXIBLE COUPLING CO.

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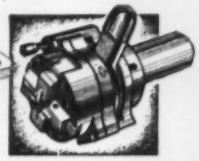


famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

THE EASTERN MACHINE SCREW CORP., 22-42 Barclay Street, New Haven, Conn.
Pacific Coast Representative: *A. C. Berbringer, 334 N. San Pedro St., Los Angeles, California.* Canada: *F. F. Barber Machinery Co., Toronto, Canada.*

INTRODUCTION TO THE STUDY OF HEAT TREATMENT OF METALLURGICAL PRODUCTS

By Albert Portevin

Fundamental knowledge and essential principles of heat treatment of steel are presented in simple and understandable manner. Research engineers, metallurgical students and steel plant metallurgists engaged in metallurgical investigations and the heat treatment of ferrous and non-ferrous metals will find this book of inestimable value.

246 pages — 4 tables

69 illustrations — Price $5.00 Postpaid

THE PENTON PUBLISHING CO.

Book Department, 1213 W. 3rd St., Cleveland 13, O.

(*Concluded from page* 164)

Two or three large pipelines are pending and award of any one could create an acute plate shortage in jig time.

Plate shipments amounted to 543,406 tons, or 7.5 per cent of total steel product shipments in March. First quarter plate tonnage was 1,439,111 tons, or 7.4 per cent of total shipments, compared with 9.8 per cent a year ago.

Stainless Steel . . .

Stainless Steel Prices, Page 158

Production of stainless and heat-resisting steel ingots totaled 290,646 net tons in the first quarter of this year, says the American Iron & Steel Institute. This was a substantial increase over the 259,191-ton figure in fourth quarter of 1954, and 187,111 tons in the first quarter of last year.

Chromium-nickel stainless output in the first quarter amounted to 153,734 net tons; high chromium heat-resisting steel 3434 tons; and other types, 113,478 tons. In the first quarter of 1954 chromium-nickel production was 106,394 tons; high chromium heat-resisting steel, 3960 tons; and other types, 76,757.

Tool Steel . . .

Tool Steel Prices, Page 158

Shipments of high speed and tool steel (exclusive of hollow drill steel) totaled 9869 net tons in March, reports the American Iron & Steel Institute. In February, 7902 tons were shipped. Figure for March of last year: 8454 tons.

First quarter shipments amounted to 25,593 net tons this year. In the like period last year, 24,002 tons were moved by producers.

Tubular Goods . . .

Tubular Goods Prices, Page 158

While some decline in demand for tube specialties is expected in July, orders for other tubular goods are expected to remain strong well into the third quarter.

Mechanical tubes and seamless tubes for oil country use are in heavy demand with no letup in sight. Producers have order backlogs extending two months.

Specialties are moving slower. Producers are taking orders for July shipment. Seamless pressure tube sales are weak, but a pickup is expected in requirements on utilities account later this year.

Cast iron pipe requirements are up seasonally. In the Pacific Northwest the market continues active, with considerable new inquiry re-

Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season; gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$25.00-$26.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 85c-87c per long ton unit c.i.f. U. S. ports, duty for buyer's account; 46-47%, 75c-80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

56-60%	$3.25-$3.80
65%	4.15-4.25

Vanadium Ore

Cents per lb, V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $114; Salina, Pa., $119; Niles, O., $125; Los Angeles, Pittsburg, Calif., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $120; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $123.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.55; Los Angeles, $127.85.

Super Duty: Hays, Sproul, Pa., Warren, Windham, O., Athens, Tex., $137; Morrisville, Pa., Niles, O., $140; Joliet, Ill., $143.

Semisilica Brick (per 1000)

Clearfield, Pa. $130; Philadelphia, $116; Woodbridge, N. J., $114.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $77.50; Wellsville, O., $81.50; Clearfield, Pa., Portsmouth, O., $87; Perla, Ark., $109; Los Angeles $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $225; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $260; Danville, Ill., $258; Clearfield, Pa., $267.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $147; Clearfield, Pa., $148.50; St. Louis, $159.30; Athens, Tex., $155.

Nozzles (per 1000)

Reesdale, Pa., $234.70; Johnstown, Pa., $240.70; Clearfield, Pa., $241.40; St. Louis, $259.45; Athens, Tex., $247.70; Bridgeburg, Pa., $267.50.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned bulk, ¾-in. grains with fines: Luning, Nev., Chewelah, Wash., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.50
Camden, N. J., ovens	24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, Ind., ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	24.00
Swedeland, Pa., ovens	24.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32.$33; 60%, $28-$29. Imported, net tons, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$47.75
2½	30	30.75
3	40	30.00
4	40	28.50
5⅛	40	28.25
6	60	25.50
7	60	25.25
8, 9, 10	60	22.75
12	72	26.00
14	60	22.50
16	72	21.50
17	60	22.00
18	72	21.50
20	72	21.25

CARBON

8	60	11.40
14, 12, 10	60	11.10
14	72	10.25
17	60	10.25
17	72	9.85
20	84	9.85
20	90	9.65
24	72, 84	9.85
24	96	9.60
30	84	9.75
40, 35	110	9.50
40	100	9.50

ported developing, including tonnage required for Alaskan projects.

National Tube Division, U. S. Steel Corp. has awarded a contract to the Gas Machinery Co., Cleveland, for two tube upset furnaces to be installed at the Lorain, O. works.

The new expanded steel pipe mill of U. S. Steel's Consolidated Western Division at Provo, Utah, recently produced its first carload of pipe for its first customer, Pacific Northwest Pipeline Corp.

Atlantic Seaboard Corp., Charleston, W. Va., has been authorized by the Federal Power Commission to construct about 84 miles of pipeline in West Virginia, Virginia and Maryland. The line will require 26-in. pipe.

Warehouse . . .

Warehouse Prices, Page 159

Distributors report active demand for all products. It is an orderly type of demand, and is devoid of the feverish pitch characteristic of the Korean war period. Sheet and plate consumers, who normally buy from mills, show no inclination to pay warehouse prices for large quantities. Plates are in the most pressing demand in the Mid-Atlantic territory, and more buyers of mill tonnages are turning to distributors for relief.

In the St. Louis district, business is brisk, with the prospect that some shortages in sizes is inevitable in the next few months. Mill deliveries to some warehouses already are extended, causing unbalanced inventories. Scarcities appear most likely in cold-finished bars and plates. Some structurals are in short supply.

Some large consumers in the Pittsburgh district are trying to accumulate inventories. These firms can't obtain extra steel from mills and are turning to warehouses. Consumers of small tonnages are slightly more active in the market.

Though sales have risen consistently during the last few months, distributors are cautious in their forecasts for the balance of the year. Some dip in warehouse business in June and July is expected as manufacturing plants shut down for vacations.

On the West Coast, quicker mill deliveries have pushed warehouse stocks above 100 per cent of normal in some products. Wide-flanged beams are in particularly active demand.

Conditions in the British Columbia warehouse trade are similar to those across the border. Shortages are developing in some products.

Automatic multiple torch burning equipment has been installed at U. S. Steel Supply Division's warehouse in San Francisco. It can cut shapes up to 12 ft wide and 42 ft in length from plates up to 10 in. thick.

O'Neal Steel Co., Birmingham, opened a warehouse at 1240 Williams St., Chattanooga, Tenn. This is a temporary location until the company can purchase suitable property for construction of a larger and more modern warehouse.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 167

March output of coke was 6,235,824 net tons, reports the Bureau of Mines. This compares with 5,394,166 tons in February and 5,144,689 in March a year ago. Of total March production, 6,130,731 tons were oven coke and 105,093 beehive.

Oven coke stocks at the end of March totaled 2,525,662 tons or 12.8 days' production.

U. S. Pipe & Foundry Co. will install 30 Koppers chemical recovery coke ovens at its North Birmingham, Ala., plant at a cost of more than $1 million.

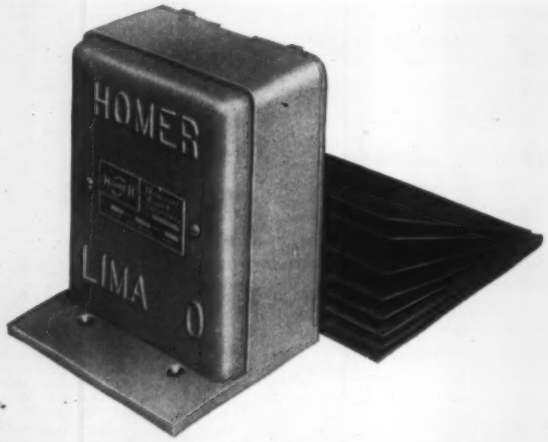
HANDLE STEEL SHEETS MORE PROFITABLY!

SAVE TIME . . . PREVENT ACCIDENTS . . . INCREASE PRODUCTION

HOMER MAGNETIC SHEET SEPARATORS

an absolute essential for the sheet metal trade

Make it easier, faster and safer for employees to handle round, square, nested, irregular or odd shaped stacks of steel sheets—in shearing, welding, pressing, riveting or similar production operations. Prevent double feeding of sheets—protect dies and machinery. Oily, polished, enameled or painted sheets separated without prying, scratching or marring the surfaces.



- **PORTABLE** —Easily moved from one location to another.
- **NON ELECTRIC** —Accidental shocking impossible —100% safe in hazardous locations.
- **GUARANTEED** —Magnetic strength guaranteed for life.
- **EASY TO USE** —Requires practically no set-up time—it's ready to go anywhere it's placed.

For complete information on HOMER Magnetic Sheet Separators—we suggest you write today for Bulletin SS-210.

THE HOMER MANUFACTURING CO., INC.
DEPT. 149 LIMA, OHIO

HOMER . . . *the FINEST in Permanent Magnetic Equipment for Industry*

Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P. 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%. Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, C 0.025% max. (Simplex 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon, F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max) $3.10. **Primos and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.5c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer, (Approx. 20% Al, 40% Si, 40 Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered, Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.05c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 11.85c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.45c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.55c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.7c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $12 per lb of contained Cb, less ton $12.05. Delivered. Spot, add 10c.

Ferrotitanium—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $6.25 per lb of contained Cb plus Ta, deld.; less ton lots $6.30.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carloads packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy, ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c. f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity, $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; Washington, Pa., $1.24.

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Scrap . . .

Scrap Prices, Page 172

Philadelphia—Prices on the major steel mill grades continue to ease. No. 1 heavy melting steel, No. 1 bundles and No. 1 busheling are available at $35.50-$36.50, delivered. No. 2 heavy melting is unchanged at $32.50, but No. 2 bundles are lower at $26.50. Other grades, including cast, are steady.

Export shipments are holding up well, but buying has eased off recently. Foreign buyers, noting the easing in the domestic market, are inclined to mark time after reducing offering prices anywhere from 50 cents to $1 a ton.

Chicago—Weakening in scrap continues, with steelmaking consumers paying $1 less for No. 2 heavy melting and No. 1 dealer bundles. No. 1 railroad heavy melting and turnings and borings were quoted off 50 cents a ton. The decline took place in the face of near-record steel production.

Pittsburgh—The latest purchase of heavy melting scrap and bundles established prices averaging $1 below those quoted a week ago. The buy was by a major Pittsburgh steelmaker. The price decline reflected weakness resulting from sizable mill inventories. The tendency also was downward in railroad scrap. Most recent purchases of No. 1 railroad heavy melting were at $36-$37, $1.50 below the preceding week's quotation, which also represented a decline.

New York—Brokers reduced their buying prices $1 a ton on four major grades. They are offering $31-$32 for No. 1 heavy melting and No. 1 bundles, $27-$27.50 for No. 2 heavy melting and $22-$23 for No. 2 bundles. All other grades are unchanged.

Cleveland—The scrap market is extremely sluggish. No purchases of consequence were reported here last week except for one buy of foundry scrap by Ford. Prices are holding at the lower levels established two weeks ago. Mill inventories are substantial. With the flow of scrap to the market seasonally heavy, the tendency is for prices to sag.

Buffalo—Although steelmaking operations are holding above theoretical capacity, easier tendencies prevail in the scrap market here following recent sales to district mills at lower prices.

Birmingham—Improvement in supply of steel scrap has resulted in an Atlanta mill eliminating the springboard it established a few weeks ago for remote scrap. It still is getting a sufficient supply at the lower prices. Foundries, too, have eliminated the springboard in effect nearly all winter for scrap outside the district. Dealers say supplies of all grades of scrap are moving into yards more freely than for some time.

St. Louis—Scrap prices here are holding despite softening elsewhere. Local prices have stayed below those at some other points.

Youngstown—The scrap market here has been hit by falling prices and reduced demand. Top grades of dealer material have declined $2 to $3 a ton.

Detroit—The scrap market shows a tendency toward softness due to oversupply. Trading is expected to be quiet for the next couple weeks, or until automotive lists come out for bids.

Washington—Consumption of ferrous scrap in March (6,052,000 gross tons) was the highest since May, 1953, reports the Bureau of Mines. The daily consumption rate and tonnage used were up 13 per cent from the previous month. At the same time, pig iron consumption rose 12 per cent to 5,537,000 tons.

The melt of scrap and pig iron (11,589,000 gross tons) in March was the largest since May, 1953, consisting of 52.2 per cent scrap and 47.8 per cent iron. This compared with 51.9 per cent scrap and 48.1 per cent pig iron in February.

Stocks of scrap held by consumers amounted to 6,404,000 gross tons at the end of the month, a slight increase over the February total. The 2,041,000 tons of pig iron held by consumers and suppliers were 4 per cent less than at the end of the previous month, a decrease for the third consecutive month.

Los Angeles—Increased foundry purchases of No. 1 cupola cast have firmed the cast scrap market. Steelmaking grades, largely specialties, are moving in a limited way.

San Francisco—Higher steel scrap prices reflect foreign competition for material and increased local consumption. One big producer last week operated at 105 per cent of rated capacity.

Vancouver, B. C.—Practically all scrap produced in British Columbia is bought for local consumption. The new mill at Edmonton will absorb the scrap from Alberta province, with freight rates from that area making it unprofitable to ship into British Columbia.

Ferroalloys . . .

Ferroalloy Prices, Page 169

Tennessee Products & Chemical Corp., Nashville, Tenn., recently acquired by Merritt-Chapman & Scott Corp., New York, has expanded its operations to include production of ferrochrome.

Structural Shapes . . .

Structural Shape Prices, Page 154

Reflecting the seasonal pickup in construction demand, shipments of steel products on building account in March rose to 804,516 net tons, 11.6 per cent of total steel mill shipments. In February, 594,660 tons of construction steel were shipped by the mills, or 10.2 per cent of the overall total movement.

Shipments to an allied consumption category—contractor products—

(*Please turn to page* 174)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

May 11	$34.83
May 4	35.33
April Avg.	36.73
May 1954	28.00
May 1950	33.82

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting	*34.00-35.00*
No. 2 heavy melting	*31.00-32.00*
No. 1 bundles	*34.00-35.00*
No. 2 bundles	*26.00-27.00*
No. 1 busheling	*34.00-35.00*
Machine shop turnings	21.00-22.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals, 5 ft lengths	39.00-40.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	39.00-40.00
Electric furnace bundles	38.00-39.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	*34.00-35.00*
Heavy breakable cast	*34.00-35.00*
Unstripped motor blocks	*25.00-26.00*
No. 1 machinery cast	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
Rails, 2 ft and under	*47.00-48.00*
Rails, 18 in. and under	*48.00-49.00*
Rails, random lengths	*43.00-44.00*
Railroad specialties	*42.50-43.50*

Stainless Steel Scrap

18-8 bundles & solids	210.00-220.00
18-8 turnings	105.00-110.00
430 bundles & solids	95.00-100.00
430 turnings	60.00-65.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	23.00-24.00
No. 1 busheling	31.00-32.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	21.00-22.00
Cast iron borings	21.00-22.00
Low phos.	33.00-34.00
Cut structural plates 2 ft and under	*38.00-39.00*
Alloy free, short shovel turnings	26.50-27.50
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	35.00-36.00
Stove plate	41.00-42.00
Heavy breakable cast	31.00-32.00
Unstripped motor blocks	25.00-26.00
Brake shoes	30.00-31.00
Clean auto cast	43.00-44.00
No. 1 wheels	41.00-42.00
Burnt cast	31.00-32.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
R.R. malleable	43.00-44.00
Rails, 2-ft and under	50.00-51.00
Rails, 18-in. and under	51.00-52.00
Rails, random lengths	45.00-46.00
Cast steel	39.00-40.00
Railroad specialties	39.00-40.00
Uncut tires	41.00-42.00
Angles, splice bars	46.00-47.00
Rails, rerolling	52.00-53.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	200.00-210.00
18-8 turnings	100.00-110.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00-25.00
No. 1 busheling	34.00-35.00
Machine shop turnings	16.00-17.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	35.00-36.00
Electric furnace bundles	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00

CHICAGO

No. 1 heavy melting	33.00-35.00
No. 2 heavy melting	*29.00-30.00*
No. 1 factory bundles	35.00-36.00
No. 1 dealer bundles	*33.00-34.00*
No. 2 bundles	24.00-25.00
No. 1 busheling	*33.00-35.00*
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*18.00-19.00*
Short shovel turnings	*18.00-19.00*
Cast iron borings	*18.00-19.00*
Cut structurals, 3 ft	36.00-37.00
Punchings & plate scrap	37.00-38.00
Electric furnace bundles	35.00-36.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	*34.00-35.00*
Unstripped motor blocks	29.00-30.00
Clean auto cast	45.00-46.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.50-37.50*
R.R. malleable	46.00-47.00
Rails, 2-ft and under	50.00-51.00
Rails, 18-in. and under	51.00-52.00
Angles, splice bars	44.00-45.00
Rails, rerolling	52.00-53.00

Stainless Steel Scrap

18-8 bundles & solids	220.00-225.00
18-8 turnings	95.00-100.00
430 bundles & solids	105.00-110.00
430 turnings	45.00-50.00

Chicago Mercantile Exchange
(Week ended May 11)

No. 1 Heavy Melting	High	Low	Close
Oct.	35.50	35.50	35.50*
Jan.	....	....	....

Sales (160-ton units): 1 October.
*Nominal

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	27.50
No. 2 heavy melting	21.00
No. 1 bundles	27.50
No. 2 bundles	*19.00*
No. 1 busheling	27.50
Machine shop turnings	13.00
Mixed borings, turnings	13.00
Short shovel turnings	*16.50*
Punchings & plate scrap	*33.00*

Cast Iron Grades

Charging box cast	28.00
No. 1 cupola	37.00
Stove plate	32.00
Heavy breakable	28.00
Unstripped motor blocks	20.00
Clean auto cast	42.00
Malleable	35.00

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	31.00-32.00
No. 2 bundles	23.00-24.00
No. 1 busheling	32.00-33.00
Cast iron borings	17.00-18.00
Short shovel turnings	25.00-26.00
Machine shop turnings	19.00-20.00
Electric furnace bundles	32.00-33.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	36.00-37.00
Structural plate, 2 ft	36.00-37.00
Unstripped motor blocks	35.50-36.50

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	45.00-46.00
Rails, rerolling	43.00-44.00
Rails, random lengths	42.00-43.00
Angles, splice bars	43.00-44.00
Stand. steel axles	35.00-36.00

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting	*35.50-36.50*
No. 2 heavy melting	32.50
No. 1 bundles	*35.50-36.50*
No. 2 bundles	*26.50*
No. 1 busheling	*35.50-36.50*
Electric furnace bundles	39.50
Machine shop turnings	21.50
Mixed borings, turnings	21.50
Short shovel turnings	24.00
Structurals & plate	40.00-41.00
Heavy turnings	34.00-35.00
Couplers, springs, wheels	42.00
Rail crops, 2 ft & under	51.00-52.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Malleable	44.00
Heavy breakable cast	41.00
Drop broken machinery	44.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	*27.00-27.50*
No. 1 bundles	*31.00-32.00*
No. 2 bundles	*22.00-23.00*
Machine shop turnings	12.00-13.00
Mixed borings, short turnings	14.00-15.00
Short shovel turnings	15.00-16.00
Low phos. (structural & plate)	34.00-35.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Unstripped motor blocks	22.00-23.00
Heavy breakable	33.00-34.00

Stainless Steel

18-8 sheets, clips, solids	210.00-235.00
18-8 borings, turnings	100.00-105.00
430 sheets, clips, solids	85.00-90.00
410 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	27.50-28.50
No. 2 bundles	16.00-17.00
Machine shop turnings	12.00-12.50
Mixed borings, turnings	14.00-15.00
Short shovel turnings	15.50-16.50
No. 1 cast	30.00-31.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	33.00-34.00

BUFFALO

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	30.00-31.00
No. 2 bundles	24.00-25.00
No. 1 busheling	30.00-31.00
Mixed borings, turnings	20.50-21.50
Machine shop turnings	19.00-20.00
Short shovel turnings	21.50-22.50
Cast iron borings	20.50-21.50
Low phos.	*33.00-34.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	42.00-43.00

Railroad Scrap

Rails, random lengths	35.00-36.00
Rails, 3 ft and under	42.00-43.00
Railroad specialties	36.50-37.50

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.50-32.50
No. 2 heavy melting	28.50-29.50
No. 1 bundles	31.50-32.50
No. 2 bundles	22.50-23.50
No. 1 busheling	31.50-32.50
Machine shop turnings	19.00-20.00
Mixed borings, turnings	17.50-18.50
Short shovel turnings	22.00-23.00
Cast iron borings	17.50-18.50
Low phos., 18-in.	38.00-39.00

Cast Iron Grades

No. 1 R.R. heavy melt.	32.50-33.50
Heavy breakable cast	35.00
Charging box cast	36.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*32.50-33.50*
Rails, 18-in. and under	48.00-49.00
Rails, random lengths	40.00-41.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 1 bundles	31.00
No. 2 bundles	24.50
Machine shop turnings	16.00
Short shovel turnings	18.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	33.00
Heavy breakable cast	33.00
Unstripped motor blocks	33.00
Brake shoes	32.00
Clean auto cast	42.00
Stove plate	34.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00
Rails, 18-in. and under	46.00
Rails, random lengths	40.00-41.00
Rails, rerolling	50.00
Angles, splice bars	41.00

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting	33.00
No. 2 heavy melting	29.00
No. 1 bundles	25.00
No. 2 bundles	23.00
No. 3 bundles	*16.00-17.00*
Machine shop turnings	*15.00-16.00*
Mixed borings, turnings	*15.00-16.00*
Short shovel turnings	*15.00-16.00*
Electric furnace, No. 1	*39.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	36.00-40.00
Heavy breakable cast	28.00
Unstripped motor blocks	30.00-32.00
No. 1 wheels	*24.00-25.00*
Stove plate (f.o.b. plant)	28.00-29.00
Brake shoes	28.00-29.00

Railroad Scrap (Delivered consumer's plant)

Rails, random lengths	*34.00*

LOS ANGELES

No. 1 heavy melting	28.00
No. 2 heavy melting	24.00
No. 1 bundles	27.00
No. 2 bundles	22.00
Machine shop turnings	8.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	30.00
No. 2 heavy melting	28.00
No. 1 bundles	29.00
No. 2 bundles	25.00
No. 1 busheling	30.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	10.00-11.00
Short shovel turnings	12.00
Cast iron borings	12.00
Cut structurals	30.00
Heavy turnings	11.00
Punchings & plate scrap	30.00

Cast Iron Grades

No. 1 cupola	40.00-43.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Mixed borings, turnings	16.00
Rails, remelting	43.00
Busheling, new factory:	
Prepared	32.00
Unprepared	28.00
Short steel turnings	16.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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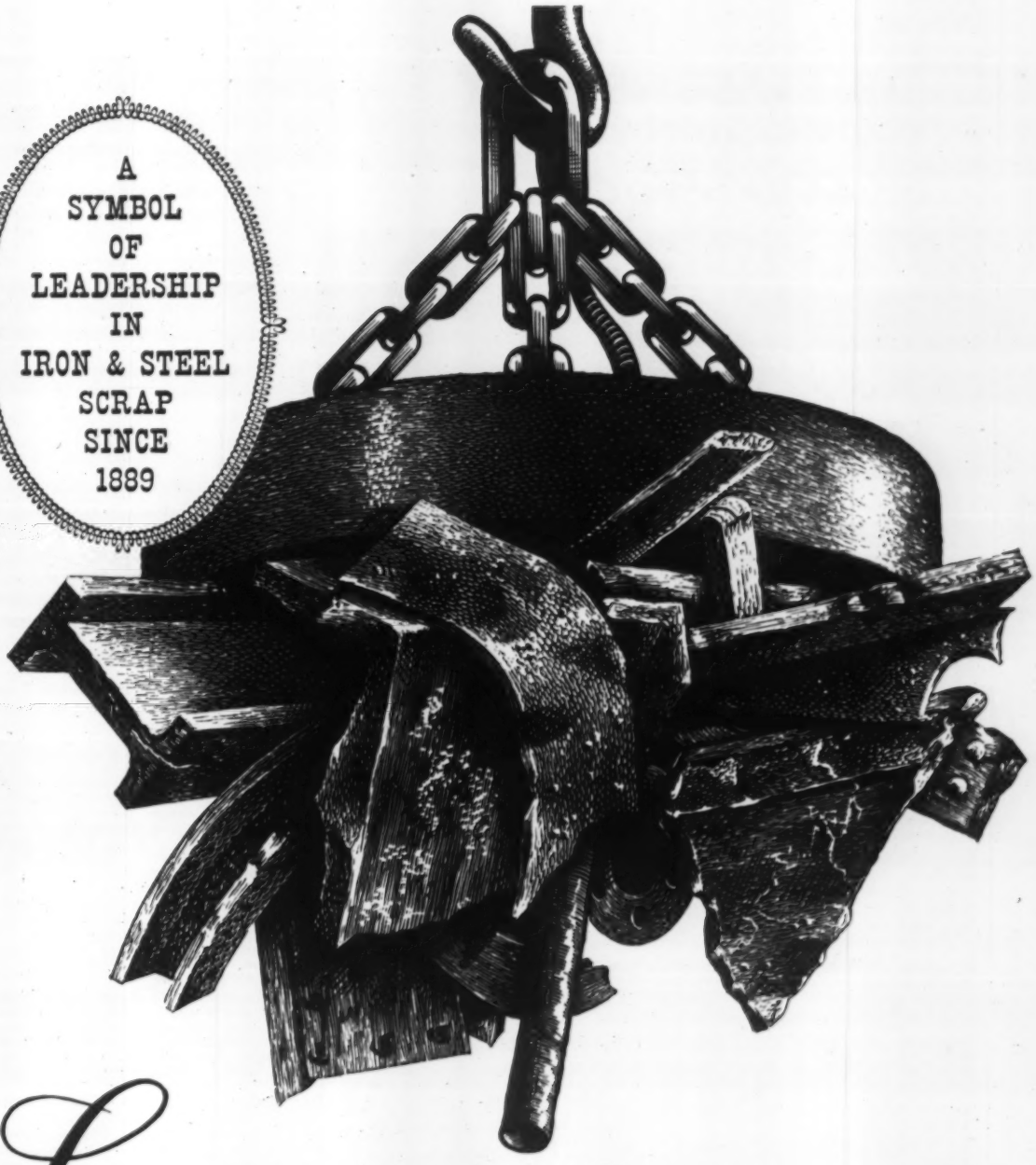

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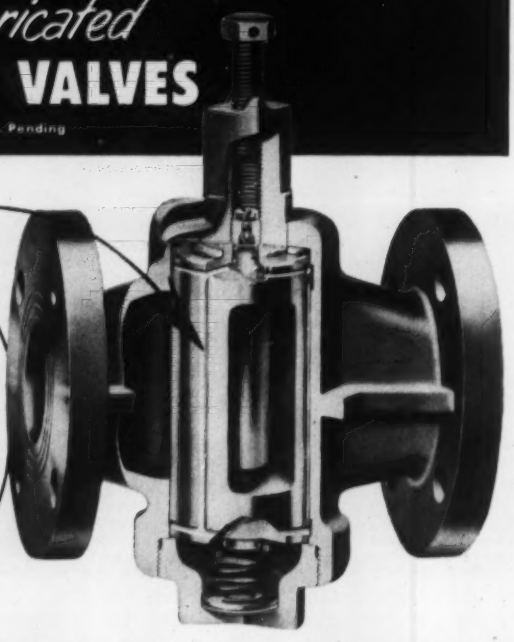

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(*Concluded from page* 171)

accounted for 323,650 tons, or 4.6 per cent of the total steel movement in March.

Structural steel inquiry is active in the East. Also, it is diversified. Not only is there a substantial amount of public work, but a growing demand for apartments, office buildings and stores is noted.

Inquiry in the Philadelphia market is featured by the largest Pennsylvania turnpike job in some time—4250 tons of bridgework in Carbon county. Otherwise, demand in the district is light, a situation reflected in limited backlogs at some of the smaller shops.

New construction awards in 27 counties of western Pennsylvania mounted to $39.6 million in March, a new record for that month.

Structural shape deliveries are not too badly extended in all instances. It is still possible for a consumer to get tonnage for July shipment, including wide-flange sections. At Pittsburgh, however, the mills find it difficult to accept early third quarter orders for wide-flange beams, while their delivery time for standard structurals is two months.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7500 tons, Vancouver, B. C., post office building, to Western Bridge & Steel Fabricators Ltd. and Dominion Bridge Co. Ltd., Vancouver.

3000 tons, Oak St. toll bridge, Fraser river, to Dominion Bridge Co. Ltd., Vancouver, B. C.

3000 tons, two power plants, Johnstown, Pa., and Rochester, N. Y., to Belmont Iron Works, Eddystone, Pa.

2500 tons, 28 palletizing furnaces, Erie Mining Co., Aurora, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

2015 tons, seven bridges, Massachusetts turnpike, Palmer, Mass., to Harris Structural Steel Co., New York; Berlanti Construction Co. Inc., Harrison, N. Y., general contractor.

1400 tons, addition, Harlem Municipal Hospital, New York, Psaty & Furman, low on general contract.

1125 tons, 12 bridges, Massachusetts turnpike, Westfield-West Springfield, Mass., to Ernst Construction Corp., Buffalo; Lane Construction Co., Meriden, Conn., general contractor.

900 tons, processing plant, Carnation Co., Seattle, to Isaacson Iron Works, Seattle.

865 tons, apartment, E. 20th St. and Third Ave., New York, through H.R.H. Construction Co., general contractor, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

445 tons, junior and senior high schools, Lima, Pa., Delaware county, to Morris, Wheeler & Co., Philadelphia.

335 tons, school, Shamokin, Pa., to Weatherly Steel Co., Weatherly, Pa.

315 tons, pumping plant, Hanford Works, to Bethlehem Pacific Coast Steel Corp., Seattle.

STRUCTURAL STEEL PENDING

4250 tons, bridgework, Sec. 36-EF, state turnpike, Carbon county, Pa.; bids June 8.

2200 tons, tower steel, Bonneville Power Administration, Portland, Oreg.; Bethlehem Pacific Coast Steel Corp., Seattle, apparently low at $516,966, f.o.b. Seattle.

650 tons, Alaska railroad terminal, Seward, Alaska, bids in to U. S. Engineer; low bidder undetermined.

450 tons, addition to police station, Portland,

Oreg.; O. E. Wayman, Portland, Oreg., low at $764,079.

282 tons, state bridgework, York county, Pa.; bids May 27.

145 tons, state bridgework, Potter county, Pa.; bids May 27.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1400 tons, Oak St. toll bridge, Fraser river, British Columbia, to Dominion Bridge Co., Vancouver, B. C.

760 tons, six military installations in Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle.

540 tons, Home for the Aged, Philadelphia, to Concrete Steel Co., that city.

212 tons, Washington state, Thurston county undercrossing, to Bethlehem Pacific Coast Steel Corp., Seattle; A. J. Cheff Construction Co., Seattle, general contractor, low at $260,367.

200 tons, Sheraton Hotel, Philadelphia, to American Engineering Co., that city (structural requirements were placed recently with Bethlehem Steel Co., Bethlehem, Pa.).

REINFORCING BARS PENDING

512 tons, Alaska railroad terminal, Seward, Alaska; general bids under consideration.

320 tons, Medical Center, American Federation of Labor, Philadelphia.

155 tons, public school, Wayne and Johnson, Philadelphia; bids asked.

125 tons, bakery, Tasty Cake Co., Philadelphia.

106 tons, state bridge work, Berks county, Pa.; bids May 27.

PLATES . . .

PLATES PLACED

200 tons, storage tanks for Texaco Co., Coos Bay, Oreg., to Consolidated Western Steel Corp., Seattle.

PIPE . . .

CAST IRON PIPE PLACED

439 tons, system expansion, Corvallis, Oreg., to Pacific States Cast Iron Pipe Co., Portland, Oreg.

211 tons, system expansion, Seattle, to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

500 tons, system improvements, Anchorage, Alaska; bids May 18.

100 tons, bids to Kent, Wash., May 16.

100 tons, 6 in.; bids to Edmonds, Wash., May 17.

STEEL PIPE PLACED

200,000 tons, 30 and 36 in. gas line pipe from New Mexico gas fields to Pacific Northwest to Consolidated Western Steel Corp. and Kaiser Steel Co. by Pacific Northwest Pipeline Corp.

600 tons, 30-in. pipe, Erie Mining Co., Aurora, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, steel pipe, Erie Mining Co., Taconite Harbor, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian National, one 1750-hp diesel unit, to General Motors Diesel Ltd.

LOCOMOTIVES PENDING

Western Pacific, eight 1750-hp general-purpose diesel units; purchase authorized.

RAILROAD CARS PLACED

Bessemer & Lake Erie, heavy repairs of 250 seventy-ton hopper cars, contract awarded to Greenville Steel Car Co., Greenville, Pa.

Canadian National, 230 freight cars; 200 fifty-ton refrigerator cars to the National Steel Car Corp., and 30 thirty-ton ore cars to Marine Industries Ltd.

New York, New Haven & Hartford, lightweight passenger train, to Budd Co., Philadelphia; train comprises six cars, each self-propelled by two 300-hp diesel engines, a modification of Budd's rail-diesel cars.

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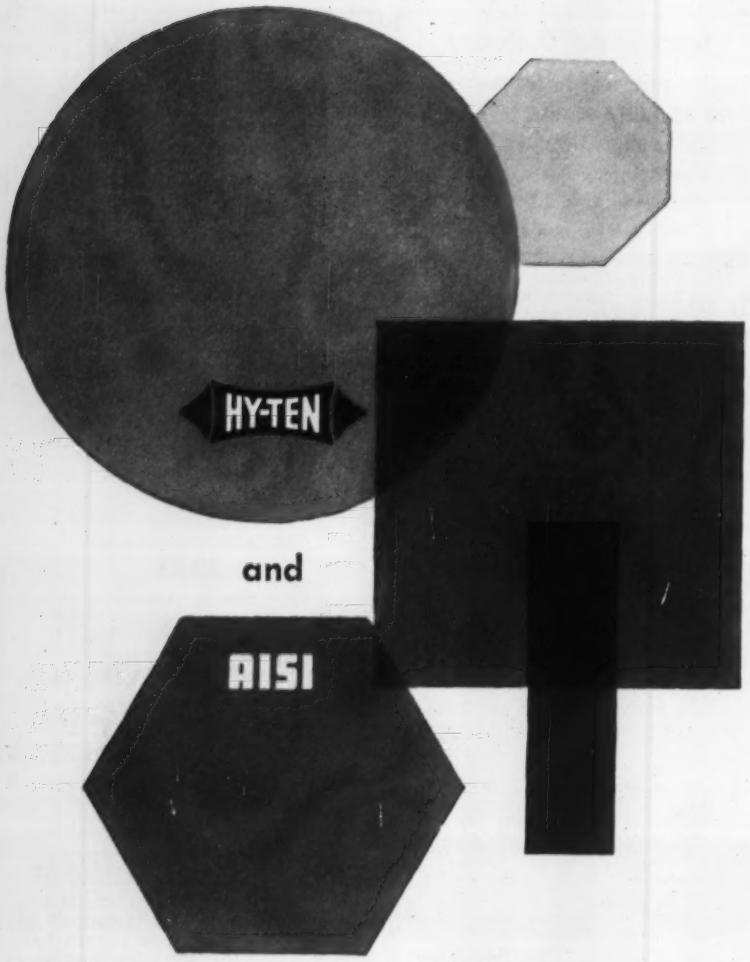

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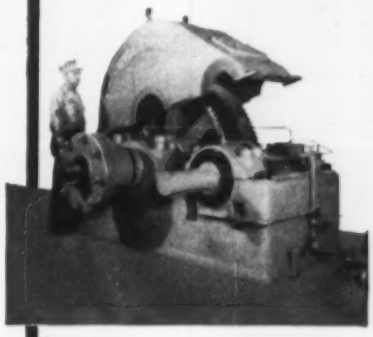
Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Gray Iron Castings

Hyde Park Castings up to 80,000 pounds are sound, accurate and physically dependable.
Precision machining is done by skilled craftsmen in our modern machine shop.
Send your blue prints for quotation.



Mill Drive

Machine Castings
Lathe Beds
Housings
Pinion Housings
Mill Housings
Shoe Plates
Layout Plates
Surface Plates

For finer finish, long life and greater tonnage, specify Red Circle Rolls.

Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

This is the tenth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Chromium and Its Effects in Alloy Steels

As previously pointed out in this series, the elements that together make up an alloy steel work both singly and collectively. In a sense they are like the components of a machine, each having its job to do, yet each working with other components to achieve an overall result.

An earlier discussion was devoted to the functions of nickel. In this one we shall outline briefly some of the purposes of chromium, another of the fundamental alloying elements.

Chromium is a versatile agent. Among other things, it fosters depth-hardenability, improves surface resistance to abrasion and wear, and promotes carburization. Of the common alloying elements, chromium ranks near the top in hardenability. This property tends to make high-chromium steels relatively air-hardening; hence it is valuable in applications where, for one reason or another, liquid quenches are undesirable.

Chromium steels are relatively stable at high temperatures and are often used where resistance to heat is important. Moreover, the presence of chromium is a vital factor in helping to retard or prevent corrosion.

The uses of chromium steels are many and varied. Among the more familiar items that often contain chromium are hand tools, gears, springs, turbine wheels, ball and roller bearings, forged shafts and rotors, etc. There are of course numerous others; virtually no list would be all-inclusive.

One of the most useful of the alloys, chromium has been the subject of long study by Bethlehem metallurgists. These technicians have a thorough working knowledge of its effects in various types of analyses. Whenever you have a problem involving chromium steels, or would like to know more about the subject in general, by all means communicate with the Bethlehem staff. Our men will come to your office or plant at any time. You will find them co-operative and helpful.

And please remember, too, that Bethlehem makes the full line of AISI standard steels, as well as special-analysis steels and all carbon grades. Your inquiries will receive our most careful attention.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

• Cleveland worm gear speed reducer installed on tumbling barrel in the malleable iron foundry of Superior Steel and Malleable Casting Co., Benton Harbor, Mich.

CLEVELANDS help castings come clean

TUMBLING barrels took a turn for the better in a Michigan foundry when Cleveland worm gear drives went to work. Used for cleaning malleable iron castings, the barrels were converted from a belt line drive shaft to individual Cleveland speed reducers. Result—dependable, space-saving Clevelands transmit power smoothly and uninterruptedly. Operations and efficiency are improved.

These sturdy, space-saving Clevelands will serve economically for years. Experience proves that Cleveland case-hardened steel worms and nickel-bronze gears actually improve with use. Clevelands maintain their efficiency, will be as reliable ten or thirty years after installation as the day they first start on the job.

Find out what Cleveland can do for your operations, before you buy or modernize equipment. Catalog 400 gives you the full story, shows how Clevelands can make hefty savings for you. Write for your free copy today. The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

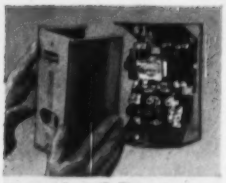
CLEVELAND
Worm Gear
Speed Reducers

WHAT'S NEW IN MOTOR CONTROL? ★ ★ ★ GET IT FIRST IN CUTLER-HAMMER

Now Cutler-Hammer ★★★ Motor Control in NEMA Size 2 for motors up to 25 HP*

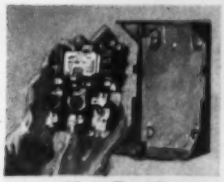
It is here . . . Cutler-Hammer ★★★ Motor Control for your larger motors, NEMA Size 2 Starters with the famous three stars on the Cutler-Hammer nameplate. The three stars that stand for three entirely new standards in motor control performance and value. Star #1: Installs easier. So much easier that installation savings often exceed the cost of the control. Star #2: Works better. So much better that this control often pays for itself many times over in just the production interruptions it avoids. Star #3: Lasts longer. So much longer that this control *never* needs maintenance care or expense in 90% of its uses. If you are one of the many users who have proved these are facts, not mere claims, you will welcome the news that your larger motors can now have this same control. Order Bulletin 9586, Size 2, today from your nearby Cutler-Hammer Authorized Distributor. He is stocked and ready to serve you. CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin.

CUTLER-HAMMER
★ ★ ★
MOTOR CONTROL
C-H



3-D Accessibility

Removing the wrap-around cover bares the entire starter for three-directional accessibility. It is wide open at front and both sides. You can see everything and reach anything. Wiring the starter is simplified and routine inspection is made so easy and complete nothing is ever neglected.



Unit Panel Construction

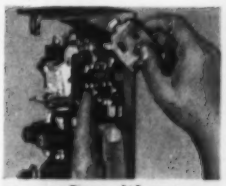
The entire starter mechanism can be removed from its case by simply loosening three screws. With mechanism out of the way, mounting case, connecting conduit and pulling wires is a cinch. A great time saver. No skinned knuckles. No damaged starter mechanisms.

Full Three-Phase Protection

Only *three* overload relays can provide positive three-phase protection to stop needless motor burn-outs and production interruptions. And only Cutler-Hammer offers three overload relays in *standard* starters without the excessive costs and delays of special starter constructions.

Adjustable Sensing Coils

Only the accurate adjustment of overload protection permits motors to work harder without damage. Now more important than ever with newer type small frame motors. Only C-H offers adjustable load sensing coils . . . for 3% loading accuracy instead of the 10% to 12% in all other controls.



Superlife Vertical Contacts

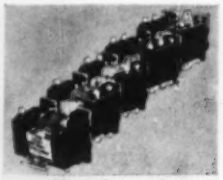
Now the famous C-H dust-safe vertical contacts have been doubly improved. New light-weight design cuts bounce to reduce arcing. Also, arcing is now pressure-quenched. Contact maintenance care and costs are ended for all time in all normal motor control uses.

For Control Panel Designers

The new Cutler-Hammer ★★★ Motor Control offers an array of spectacular new features to provide many exclusive advantages in circuit planning, compact panel design, better motor protection and better control performance. Be sure you have complete design data on this advanced equipment. Write or wire today.

New Control Components

All parts of the new C-H ★★★ Starters in NEMA 0, 1 and 2 Sizes are available as components, also complete starters on convenient unit panels. Electrical interlocks are available to provide additional control circuits when desired.



New Control Relays

Finest of control relays. 10 and 15 Amp. 2-3-4-5-6 poles. All contacts instantly convertible from NO to NC or vice versa. NO or NC status seen at a glance without removing cover. New armored magnet coils color coded for voltage and frequency.

New SD & HD Pushbuttons

New standard duty pushbutton station with pilot light offers many exclusive features, typical of complete C-H line. Watch soon for announcement of the revolutionary new line of C-H heavy-duty oil-tight one-hole mounting pushbuttons.